DOCUMENT RESUME

ED 424 989 PS 027 175

AUTHOR	Robertson, Anne S., Ed.
TITLE	Proceedings of the Families, Technology, & Education Conference (Chicago, IL, October 30-November 1, 1997).
INSTITUTION	ERIC Clearinghouse on Elementary and Early Childhood Education, Champaign, IL.; American Univ., Washington, DC. Mid-Atlantic Equity Center.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	1998-12-00
NOTE	277p.; For individual conference papers, see PS 027 176-207.
CONTRACT	RR93002007
AVAILABLE FROM	ERIC Clearinghouse on Elementary and Early Childhood Education, Children's Research Center, 51 Gerty Drive, Champaign, IL 61820; Tel: 800-583-4135 (Toll-Free); Tel: 217-333-1386; Fax: 217-333-3767; e-mail: ericeece@uiuc.edu (Catalog No. 222, $15 plus $1.50 shipping and handling for orders in the U.S.).
PUB TYPE	Collected Works - Proceedings (021) -- ERIC Publications (071)
EDRS PRICE	MF01/PC12 Plus Postage.
DESCRIPTORS	*Access to Information; Child Rearing; Computer Mediated Communication; *Computer Uses in Education; Computers; *Educational Technology; Elementary Secondary Education; *Equal Education; Family School Relationship; Family (Sociological Unit); Gifted; Home Schooling; *Internet; Parent Participation; Parent Role; Safety; Special Education; Technology; *World Wide Web
IDENTIFIERS	*Families Technology and Education Conference; Technology Integration

ABSTRACT

The Families, Technology, and Education Conference was held in late 1997, when computer technology and the Internet were raising concerns as well as presenting new opportunities for parents. The conference papers in this collection are organized into six sections. Papers in the General Sessions section are: (1) "Reading the President's Technology Literacy Challenge: What's Next?" (Roberts); (2) "Equity and Young Children as Learners" (Bowman); (3) "Families, Education, and the Technological Age" (Somerville); and (4) "People Make Dreams Come True, and Technology Expands the Possibilities: An Educational Journal across the United States" (Blondin family). Some of the papers in the Applications section include: (1) "'Learn & Live': A Documentary Film from The George Lucas Education Foundation" (Patty Burness); (2) "Making the MOST of Out-of-School Time: Technology's Role in Collaboration" (Coltin and McGuire); (3) "Child Care Consumer Education on the Internet" (Goldstein); and (4) "Military Teens on the Move: An Internet Resource for Military Youth Facing Relocation" (Wright and others). Some of the papers in the Equity section include: (1) "Dual-Use Technology: A Total Community Resource" (Degnan and Jacobs); (2) "Families, Equity, and Technology: 'The 81 Percent Solution' Revisited" (Komoski); (3) "NeighborhoodLink: A Community Network for Cleveland's Inner City" (M.E. Simon); and (4) "Buying into the Computer Age: A Look at Hispanic Families" (Wilhelm). Some of the papers in the Exceptionality section include: (1)

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"College Planning for Gifted Students" (Berger); and (2) "Comprehensive Monitoring of a Student's Activities" (Rubovits and Mulberry). Papers in the Internet section include: (1) "Early Adolescent Social Networks and Computer Use" (Orleans & Laney); (2) "Using Internet Resources to Strengthen Community Programs and Collaborations for Children, Youth, and Families at Risk" (Swanson and others); and (3) "Moral Development in the Information Age" (Willard). Some of the papers in the Links section include: (1) "Applications of Technology to Linking Schools, Families, and Students" (Bauch); (2) "The Family-School Connection and Technology" (Blanchard); (3) "Using Technology To Link Families and Schools to Research-Based Information" (Osher and Snow); and (5) "Using Technology to Develop Programs of School, Family, and Community Partnerships" (B.S. Simon and others). (LPP)

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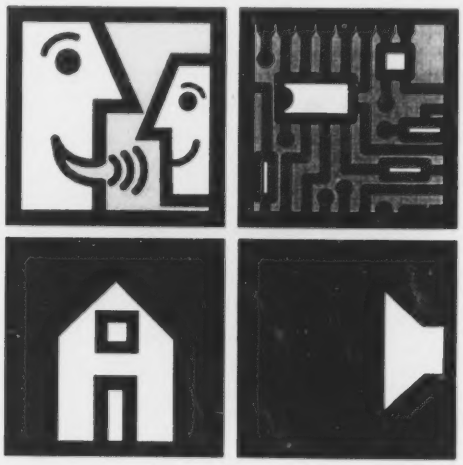
Proceedings of the Families, Technology, & Education Conference

October 30 – November 1, 1997



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December 1998

Proceedings of the Families, Technology, & Education Conference

Edited by Anne S. Robertson

Catalog #222

Published by:

ERIC Clearinghouse on Elementary and Early Childhood Education
National Parent Information Network
University of Illinois at Urbana-Champaign
Children's Research Center
51 Gerty Drive
Champaign, IL 61820-7469

This publication was prepared with funding from the Office of Educational Research and Improvement (OERI), U.S. Department of Education, under contract no. DERR93002007. The opinions expressed in this publication do not necessarily reflect the positions or policies of OERI or the Department of Education.

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Introduction

Dianne Rothenberg ■

The Families, Technology, and Education Conference was held in late 1997, when computer technology and the Internet were raising new issues and concerns as well as presenting new opportunities for parents in work, education, and family life.

It also came at a time when research findings were often, as they continue to be today, in the public eye. Brain development research findings had been brought to the attention of parents and educators through a recent White House Conference on Early Childhood Development and Learning (April 1997). That conference brought together neuroscientists, policy makers, physicians, parents, and legislators to discuss the growing body of evidence suggesting that the minds of infants are active from birth, that parents and caregivers have major roles to play in early learning and development, and that what parents do in the earliest years affects children's intelligence, curiosity, confidence, and problem-solving abilities. While these research findings offer no new implications for practice and generally support recent insights into children's learning, the current wide dissemination of them is a recent development and one that takes full advantage of the Internet to spread the word to parents.

But brain development research is just one area in which researchers have information to share with parents. There is also a growing research base on the importance of high-quality child care in the lives of young children and the beginnings of a research base on appropriate uses of technology in education. In both of these areas, Internet Web sites and discussion groups also are beginning to play a central role in dissemination of research findings.

As we met from October 30 through November 1 to discuss the intersection of families, technology, and education, we heard from parents, and from those using technology in their programming for and with parents, that there is indeed a connection between understanding and using research findings and the new technologies. As parents try to absorb the results of brain development research and figure out what these findings mean for how they should raise their children, as they read and hear repeatedly that high-quality child care is important for the optimum development of their children, and as they intuitively become advocates for high-level uses of technology in their children's schools, they are also locating, retrieving, and using information in ways that could not have been imagined by parents a generation ago.

In essence, all of us who are parents and grandparents now are learning by trial and error how to adapt to a high-tech world. We are being informed by the new technologies as well as using technology to share our concerns, problems, and questions with a worldwide community of other parents and to communicate with our children and grandchildren. It is a brave new world out there, and parenting is not exempt from the effects of technology.

At the ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE), we have been learning, through our projects PARENTS AskERIC and the National Parent Information Network, that parents are eager to use the new technologies to find information but that they also need a little help at times to sort through it all. The information overload that we are all

experiencing at work and at home is particularly hard on parents, who know that a great deal is at stake in raising their children.

The new technologies also seem to have raised concerns about our children's safety in an online world. How can we help and guide them as they navigate the World Wide Web—a resource that is highly interactive and engaging, yet one that can also pose dangers to them? This is a major concern of many parents, especially those of older children and adolescents. Of course, the Internet can also be misused. It offers not only some objectionable sites, but much that can waste valuable time. It can distract us and our children from the many worthwhile tasks upon which we should be spending our time. Concerned parents told us at the FTE Conference that they try many kinds of filtering techniques to combat these problems—perhaps most commonly software filtering agents. But filters are imperfect, at best, and won't necessarily be found on the neighbor's computer. Software filters also don't teach children why their parents don't want them to be exposed to certain kinds of situations. The best filter is a parent sitting with a child—of any age—who is using the Internet. Parents are learning that the Internet is not a babysitter; nor is it always a safe place to visit unaccompanied by a caring adult.

Conference participants discussed the faults of the Internet as well as the potential offered by it and other new technologies to improve family life. At the same time, the Internet continues to affect profoundly our thinking, our language, and how we communicate. It is sometimes difficult to keep in mind that the changes technology has introduced are just the beginning of a long cycle of social change that will be pushed by advances in technology. We can expect, for example, that while reading will remain the primary adult skill needed to function well in our society, the printed page will begin to occupy a slightly different role. I can imagine a day when parents and children will take their lightweight notebook computers to the library and download books onto them, and the books will simply erase themselves from the computer on the date they are due back at the library. The computers will be so light, the resolution will be so clear, and they will be so indestructible, that parents and children will be able to read at the beach or in bed just as they always have.

The greatest concern expressed at the FTE Conference about the new technologies and their role in family life was equity. It is likely that equity concerns will diminish over time, as computers and the Internet become more integrated into our daily environments. Already, many public libraries and other agencies in Illinois, for example, provide public access terminals with Internet access for the general public at no fee. At ERIC/EECE, we encourage schools to open their computer labs to the parents and neighbors on whose funding they clearly depend. Communities will continue to find creative ways to increase access to the new information technologies for all of us. As one example, the University of Illinois Graduate School of Library and Information Science recently received a large federal grant to collect 1,000 outdated computers from local businesses and, with the help of teenagers from low-income families working with graduate students, upgrade or rebuild those computers. Each teenager who takes part in the program gets to take a computer home, and the rest are being distributed throughout the community to low-income families and organizations.

Such efforts are significant and widespread in many communities across the nation. Decreases in the cost of equipment are also likely to continue, and new kinds of technologies, such as Web TV and access to the Internet through cable television, will become very inexpensive and very common at all levels of society. Parents who take part in our online discussions equate Internet access and use with power and influence in our society. One of their most cogent hopes as expressed at the FTE meeting was for greater access to the Internet for all families in all parts of the community. As the FTE Conference papers contained in this volume show, the thoughtful implementation of the new technologies can enhance parents' access to information on, and provide assistance and support in, the task of parenting.

general sessions

General sessions at the Families, Technology, and Education Conference were devoted to broad issues related to technology use in the lives of families. Each of these presentations points to a cluster of issues in the use of technology in the education and development of children.

Dr. Roberts, who came to the U.S. Department of Education from the Office of Technology Assessment in 1993, has successfully focused national attention on the importance of getting schools connected to the Internet and has encouraged schools to devote sufficient resources to training. As the U.S. Department of Education's Director of Educational Technology, Dr. Roberts has worked to increase access to and the quality of use of computer technology in schools and libraries through offering grant programs and planning for the E-rate strategy. Mike Eisenberg, creator of the "Big Six," a nationally accepted foundation of information skills necessary for learning in the next century, and director of the ERIC Clearinghouse on Information & Technology, is a well-known advocate for school library and media centers, and for school librarians/media specialists as in-school experts on the Internet. Dr. Eisenberg focused in his presentation (which is not included in the proceedings) on information skills that will be needed by children in school and as adults, and on helping children with homework through technology. Barbara Bowman of the Erikson Institute discussed technology and young children, and especially equity and teaching issues related to technology. Scott Somerville, of the Home School Legal Defense Association, discussed the growing home schooling movement, which has been substantially supported by computer technology. And the Blondins, a Michigan family who traveled across the country with their children and stayed in touch with the school in their home community, described their journey and how they enabled their children to keep up with school work and share the experience with their classmates via notebook computers and the Internet. Their presentation speaks to our growing understanding of education as a *process*, not a *place*.

Reaching the President's Technology Literacy Challenge: What's Next?

Linda G. Roberts ■

Abstract

Linda Roberts, the U.S. Department of Education's Director of Educational Technology, introduced the Families, Technology, and Education conference by discussing the Clinton Administration's policies and goals for technology use in schools. Issues discussed include equipment and accessibility, teacher training and professional development, and integrating computers into the curriculum. The government's Technology Fund, competitive grants, the education rate, and equity and quality concerns are also briefly discussed. This introduction concludes with the observation that the bottom line of all efforts to use technology well are to make sure that there are benefits to all of society—not just to learning in classrooms, but to learning for the rest of our lives.

■

Introduction

What I would like to do in the short time I have is give you a sense of what we are trying to accomplish and what's happening that I think is important in terms of both policy and programs

I want to talk about why technology matters and point out some of my concerns—because there always are concerns. Finally, I want to talk about what I think you all can do to help me, because we don't do it all in Washington—you do it in every one of your communities.

Goals

What are our goals? What are we trying to do with technology? What we've worked on so far—and please understand that we can do much more—is the K–12 education system. This is the area where we thought that technology could make the greatest difference. We began 3 years ago and took a year and a half to develop a strategy based on what we learned in meetings across the country, hearings, forums, and several month-long seminars online. We talked to school board members, to parents, to teachers, to students, and to industry leaders, and civic and local government leaders. We talked to everybody who would have a stake in helping us think through technology use. It was amazing to me how consistent the messages were about what we have to do to really make technology make a difference in education.

Equipment and Accessibility

The first message was that we have to get technology into the schools so that it is both ubiquitous and accessible. This means getting modern computers into the classroom and getting those classrooms connected. Even if there are computers in the lab, it doesn't necessarily mean that they are available to students when they're doing their work. (As we were doing this, the whole phenomenon of the Internet was just happening literally under our feet. Remember this was about 3 years ago.)

Professional Development

The other message we heard over and over again was that if we don't help teachers learn to use technology, we might as well not buy one computer or lay any cable out there. Training is taken for granted, and we don't really invest very much in professional development overall. But this is an area where we must invest in training and support—concentrated effort and support and continued learning, and continued evolution of resources—because everything keeps changing.[1]

Most importantly, there's got to be support. I don't think teachers are any different from anybody else—we all learn incrementally; we don't learn everything all in one day or one week, or even in one year. People started to tell us that when you look at the technology budget that's in place, you should really worry if there isn't about a third of the budget devoted to *people*—to support, to training, to hand holding, to curriculum development. The average is somewhere around 10%.

Technology as a Means to an End

The last thing we heard over and over again, and particularly from the research community and from the school districts who had already been there, was that we must not lose sight of what we are trying to accomplish educationally.

When we started to look at some school districts using technology successfully, we found that when you come into the school and you talk to people about what they're doing, they never talk about technology. Technology is there, but what they talk about is their curriculum goals, their content goals; what they're trying to accomplish; what they think students should be able to do with these resources, what skills they need to have, what knowledge they need to have. It was clear to us that we had to somehow find a way to make the connection between educational reform—the standards, the things you try to accomplish educationally—and the applications of technology.

Recent White House Initiatives

Technology Fund

We've been very successful in the budget so far. We have a 5-year, $2 billion Technology Fund that goes to the states. The smaller states get just minimum grants in the first year. The very small states (by population) receive grants of a million. The larger states receive grants between 14 and 16 million. That was $200 million a year. This year, we hope it's going to be $425 million.[2] Everything will double. What's so encouraging to us is that this money is leveraging unbelievable resources at the state and local levels. The investment is much larger there. Federal funds have acted as a catalyst and in some cases the glue that brings things together.

The other thing I'm very encouraged about in terms of the Technology Fund is how much of the money is actually being used for professional development.

Competitive Grants

The second program that we were able to put in place was a competitive grant process to allow educators and school districts to live out their dreams and to develop a vision about technology and its compelling applications across the curriculum. The grant program was intended to encourage school districts to go out and seek partnerships with other districts, with libraries, with museums, with computer companies, with software developers, with telecommunications providers, with colleges and universities. We have had three rounds of these Challenge grant competitions, and every year, they've gotten better and we have received more applications. This past year, we received 625 applications.

We feel very good about what these projects are doing. What's even more exciting to us is the number of projects we could fund. We have about 62 projects overall, but they involve hundreds of school districts and hundreds of individual business high-tech partners. It's like venture capital for education, for *public* education. The grant application has to come from a school district.

As I said, we have 62 of those projects, and we expect to do another round this year. We've asked for enough money to do what we call the fourth round.[3] It looks like Congress is going to give us an extra $30 million to do a new kind of Challenge grant competition that is going to focus on new models of professional development for both teachers in teacher education programs and for teachers in the field.

E-Rate

The last thing that we have put into place is probably the most momentous of the policy and program initiatives. What I'm talking about is the Education Rate (E-rate). How many of you know what the E-rate is? In a nutshell, the E-rate is an unbelievable bargain that we struck in the passage of the Telecommunications Act.[4]

In the early stages of the discussions about the Telecommunications Act and the potential that we might have there to do something, it turned out that data were very important. I met with the head of the National Center for Educational Statistics, who did a fast response survey to find out how many schools and classrooms have access to the Internet. As a result, as the Telecommunications Act discussions were moving along, and we were starting to

propose the idea that this universal service fund should support affordable access for schools and libraries, we had the data, and we were able to say, "Only 3% of classrooms have access today. And the reason more don't have access is because the costs are so high."

In addition to this survey, with the help of many people like you who were on the Internet, we found out what schools were paying, per month, for Internet access. It was amazing. Costs ranged from nothing in some cases, because they were able to link up with a university or they found a patron, to about $200, to as high as $2,000 per month. We were able to show how many people were disenfranchised because of the system that was in place. We convinced Congress that the E-rate was worth doing. Never before have we had a Secretary of Education testify before the Commerce Committee, but Secretary Riley did, and he convinced them that this was an opportunity for all of us—that it was a win for the telecommunications industry because ultimately this would expand their markets—and it was a real win for education because we would level the playing field for everybody.

In the process of the discussion, we had a lot of help from the American Library Association, and very quickly we became convinced that public libraries absolutely had to be in this equation. This was an interesting point at which we almost lost it all because everyone marched up to the table and said, "Me too." The whole idea would have blown apart, but the Secretary very strategically said, "Let's start here. Let's get schools and libraries, schools and libraries." That's what we kept pitching, and we've done it.

Equity and Quality

Why do we think having technology in our schools is important? There are many ways this technology can significantly contribute to our schools' effectiveness and to real learning across the curriculum. It will serve children well for the rest of their lives.

I started to say before that, with technology, there always remain issues. I think that we are on the road; I think we have very good models for what to do; and I think that we can make it happen. But what I worry the most about are two things. One is, of course, the issue of equity.

The other issue is quality. The quality of what we do, the content of what we do, is critical. Particularly if we look at the Internet and what's happening with the Internet, we can go two ways. We can let it become overcome, overblown, or overwhelmed by what I would describe as the not-so-great and in some cases harmful resources that we don't want any of our kids to have access to. The good news is that the Internet is a technology that has tools in it that allow the education community—broadly that's K and beyond, including libraries, museums, and all the institutions that have a stake in learning—to be contributors to and developers of the resources that can be out there. But I will tell you that I think we are still investing far too little as a nation in high-quality content and in high-quality resources.

If you ask me what I'm going to be concentrating on in the remaining 3 years that I think I have with this job, it's going to be to work in these areas. I think the equity issues are going to be OK as long as we are vigilant in our communities, vigilant in playing out the E-rate, and in encouraging universal access. We have to get technology into our communities; we have to get it into our libraries; we have to get it into our schools. We can't allow what looks like the demographic profile of today to remain the profile of tomorrow, which is if you are moderately wealthy and beyond, you are 7 times more likely to have a computer in your home and even 10 times more likely to have Internet access than if you have family income below $25,000 a year. We know we can't just allow this to continue. We've got to invest in our communities.

Conclusion

I think that one of the ways we can proceed is to build partnerships through our schools, through our libraries, and through our communities. These partnerships will build the kind of foundation for learning and resources so that every student, every family, and every community has the benefit of these technologies.

I was just at the Star Wars opening at the Smithsonian Museum, which I know is going to be visited by millions of people. You know what the real message is in this Star Wars exhibit? It's a message about myths and society and culture and ideals. What is so amazing about what George Lucas and all those creative people did in the Star Wars trilogy was that they used technology to tell an incredibly powerful story. They used characters, ideas, and myths to engage many, many people in society. Technology was used to convey powerful

ideas. I think that the bottom line of all of our efforts to use technology well is in fact to do good, to make sure that we get benefits, substantial benefits, to all of our society—not just learning in classrooms, but learning for the rest of our lives. We're on a really great adventure.

Endnotes

[1]In FY99, $75 million was appropriated for a new program, "Technology for Tomorrow's Teachers," which will focus on technology teacher training for prospective teachers.

[2]$425 million was appropriated for both FY98 and FY99.

[3]Congress did appropriate the extra funds, and 20 new grants were awarded in FY98 focusing on professional development. Also, a new competition will be run in FY99.

[4]The E-rate is now being implemented in schools and libraries all across the country. In November 1998, funding commitments totaling $1.925 billion started being distributed.

■

Equity and Young Children as Learners

Barbara Bowman ■

Abstract

This edited transcription of a presentation by Barbara Bowman, president of the Erikson Institute, discusses young children and computer technology. Many children from low-income and minority communities are not taught the skills and knowledge necessary to fully participate in the economic, social, and political life of the country. Schools need to start early, to recognize the unique nature of how young children learn, and to design programs that will ensure that all children have the same opportunity to participate in the technological world of the 21st century. These programs can be used in different ways and can be viewed as points on a continuum. At the most open end of the continuum is the software that reflects the thinking of the user. Moving along the continuum from open and active to closed and passive are computer applications that extend children's thinking by providing a structure with which to discover new ideas, new ways of thinking and reacting. Next are applications that provide information asked for by the user. Finally, at the most closed end of the continuum are programs that set problems and determine correct answers. Programs that are the most open are the most important ones if we are to prepare children well for the 21st century. Young children can learn that technological skills are socially desirable and expected of them or conversely that such knowledge is exclusive and more available to some people than to others. Teachers must consider the effect, for example, of offering middle-class children opportunities to play with technology and use it as a resource for their thinking while providing few such chances for poor children. Similarly, technology can be used primarily as an individual and autonomous activity, or it can encourage cooperation through networking and collaborative activity.

■

Introduction

The National Assessment of Educational Progress reported several years ago that more than half of the nation's 17-year-olds are inadequately prepared for jobs that require technical skills or to matriculate in college science courses. Many of these children are from low-income and minority communities, where they are not taught the skills and knowledge necessary to fully participate in the economic, social, and political life of the country. Chief among the reasons for this shortfall is that children have not learned to use technology creatively and competently. Clearly, the challenge to America's schools is to better prepare children to be competitive in the technology race ahead. I suggest that means schools must start early, recognize the unique nature of how young children learn, and design programs that will ensure that all children have the same opportunity to participate in the technological world of the 21st century.

The 1986 position statement of the National Association for the Education of Young Children (NAEYC) says, "Early childhood educators have a responsibility to critically examine the impact of technology on children and be prepared to use technology to benefit children." This is a very different position than most organizations and people had about computer technology for young children when I began to speak in 1978. Indeed, many of my colleagues worried that using technology would deny children the kind of authentic experience captured in blocks and paint. Or they believed that it was much too early to expose children to such complex machinery, and they would simply break it without getting anything useful from it. I am delighted that today teachers, administrators, parents of young children, and NAEYC

recognize the importance of computer technology in the lives of all of us, children included.

Why Do We Teach Computer Technology to Young Children?

My first question that I'd like to discuss is: why do we spend time thinking about teaching computer technology to very young children? (And when I talk about young children, I mean children between 3 and 8.) Our world is full of computers, which children use every day. Children as young as 3 regularly use computerized toys, telephones, televisions, VCRs; and even though they usually do not know it, they see computers at work in cars, in adult work environments, at the check-out counter of the supermarket. And with the penchant that young children always show for the artifacts of their community, technology has quickly and easily been incorporated into the daily lives of most young American children—even more quickly than many adults. Young children accept these new technologies. We don't seem to need to spend very much time teaching them to use them.

Why then are we making all this fuss about teaching young children about computers? I think the answer to that question is that there are different ways to use computers, some of which require more preparation than others. For instance, sometimes we use applications that are already programmed into the computer, and the only thing we must learn is how to release the machine's capabilities. The check-out counter worker at the supermarket just has to learn how to rub the object across the computer screen in order for the cost to register. The young child only has to learn how to operate the joystick to get his truck to turn to the right or to the left. The child only needs to turn on the computer and load Math Rabbit for a series of problems to come up, the answers to which are already programmed into the computer. She only needs to match the letters of her name to those the teachers have programmed, and she will be rewarded with bells and whistles. These procedures are quite easily learned by most of us. (Except some of us like me who has to get my granddaughter to come and program my VCR!) The task is to learn the standardized set of procedures, follow them, and let technology do its thing.

Another way to use computers, however, is as a tool—a tool to solve personally interesting problems, a tool whose products we create, an instrument that reflects our unique thinking. This way of using computers may rely on routine actions by the computer as in a word-processing program where you press the A on the keyboard and the screen reflects an A. But the user has to take that A and all the other letters and notations on the keyboard and write something that makes meaning to other readers. The user must create, and the machine only reflects the user's creativity. Learning to use computers in this way is a far more difficult process than learning to turn on a drill-and-practice program such as Reader Rabbit. Although the content of Reader Rabbit may be challenging, if not always interesting, it offers little information about computers as tools.

When I started thinking and talking about computer technology and young children, the distinction between these two ways to use a computer was clearer. In those days, computer-assisted instruction was the primary mode for using computers with young children, and many of us dubbed those applications as electronic worksheets. The computer asks the question, and the child's answer was immediately graded as right or wrong. The other way was when children engaged the technology for their own interests. Logo was one such program, and although it was quite difficult for most young children, it did present an opportunity for children to instruct computers instead of the other way around.

Today, my former dichotomy has blurred, although I believe it's still relevant. Now I think about applications as falling on a continuum from active to passive, from hard-wired drill and practice to word processing and computer graphics, with several variations in between. My current way of thinking about computer applications is that there are at least four points on the continuum. At the most open end is the software that reflects the thinking of the user. The child controls the tool, telling it what to do to implement his or her design. Examples of this type of computer application include word-processing programs, calculators, and graphics programs that help children arrive at personal goals and objectives. This is the case when they use a calculator to solve an arithmetic problem or use a paint palette or a drawing program to make a picture. In these instances, a child must have a vision and understand the potential of the tool and be able to engage it to both stimulate and reflect on the mental task being performed.

Moving along the continuum from open and active to closed and passive are computer applications that extend children's thinking by providing a structure within which to discover new ideas, new ways of thinking and reacting. Examples of this type of software would be simulations, story boards, and games. The child is active and makes discoveries, but only within the constraints of the program. In other words, the programmer controls the possible visions. One example is the rainforest or the underwater programs that EduQuest puts out that involve a series of pictures in which the child can insert different plants and animals and insects and all kinds of different things. At the top, it has a bubble, and the child can also write a story. There are a number of different pictures, and the kind of story that the child might write can vary. The program gives the child some clues about what he or she might do. Obviously it constrains what the child can do, but she can make the animals bigger or smaller and she can make lots of insects or no insects. There's some vision involved, but the programmer has in essence cut down what it is the child has control over.

Next are applications that provide information asked for by the user. Examples for young children include encyclopedias, dictionaries, and the Internet. The content is programmed into the computer by someone else, but the individual can choose information he or she wishes to access and use it according to his or her own wishes. Southern Bell has an experimental program that I saw a year or two ago in which the child dictates the story and on the screen comes the written form of the story, which can be printed out. The child can immediately see his own words printed out in a story format. These kinds of programs have enormous advantages for children.

The President has been talking recently about having every child have access to the Internet. I can't resist telling you this story like a doting grandmother. I've got lots of grandmother stories, but one of my favorite grandmother stories is my 10-year-old granddaughter coming to me and saying she needed to write an essay on John Alden. Being a good teacher, I said, "Well, we have a couple of encyclopedias there, and we have the two on the computer. You should go read what they say and then come back and we'll talk about it." So she came back and she said, "You know, they don't even know when he was born. They have two different dates." It suddenly struck me very clearly—what are we doing to help children when they get on the Internet evaluate the information they are going to have? I felt like telling the President, "Wait a little while; we're not ready for every child to be on the Internet."

Finally, at the most closed end of the continuum are the programs that set problems and determine the correct answers. Examples of these applications are computer-assisted instruction, reading and arithmetic programs. These tutorials focus on the transfer skills, and although they can save teacher time, there is little evidence that they are in any way superior to a good teacher.

All of these types of computer use have value and should be part of the learning environment for young children. But I believe that those that are the most open—where the child can be most cognitively active—are the most important ones if we are to prepare them well for the 21st century. It is unfortunate that many schools focus more on closed-end tutorials than on the more flexible and child-directed programs. This is particularly unfortunate for children who do not have access to computers outside of school and are therefore deprived of the more intellectually challenging experiences available.

What Do Children Need to Learn about Computers?

My second question then is what is it children need to learn about computers? And I might say by implication, what do their teachers need to learn? First of all, we need procedural knowledge. Whether the task is dialing the telephone, starting and guiding a car, getting a picture on the television—we need to know some procedures. We need to know what to do to get it to work. As a society, we depend heavily on procedural instruction. It permeates how we teach and learn in western cultures because of the overwhelming number of skills that must be learned to operate in a complex environment. For example, most of us can describe the procedures necessary to engage our cars, but we haven't the faintest idea how the internal combustion engine works or how to make one.

Procedural knowledge is a step-by-step process: first you do this, then you do that, then you do the other, then you get your desired results. Much of what young children need to know about computers is procedural knowledge. How to turn it on, how to

load the program, and how to respond to the stimuli on the screen are important skills. As I mentioned earlier, children learn these procedures incredibly quickly. They, as we, do not expect to understand why these pieces of equipment work and are satisfied just to use them.

But there are dangers if we rely only on procedural knowledge. Consider the number of children who do not understand the place value significance of 25 + 5. But they do know that if you add 5 and 5 you get 10, and if you put the zero down and take a little 1 and put it over the 2 and then add the 1 and 2 together, you will get the right answer. However, they do not understand that there is another set of 10 objects that is defining the place value of their number. Such children are limited in their ability to use arithmetic knowledge to develop new understanding of numbers.

So what is comparable understanding of computers for young children? What do we need to know about them if we want to help insure their technological education and not just their procedural knowledge of computers? There are some theoretical and philosophical positions that can guide how we conceptualize the role of technology in the education of young children. One is the developmental theories of Jean Piaget. Piaget emphasized the importance of young children developing schemata for the construction of relationships between objects and for symbolizing those relationships and symbols of those relationships through the child's own action and out of their current understanding of the problem. This suggests that young children need computer hardware and software that permit them to explore at their current levels of understanding to understand the symbolization potential of the system and that permit them to confront problems of interest to them.

Young children, however, often use ideas in the beginning with little understanding of the concepts being represented. For instance, what do you think a 3-year-old means when she says, "my grandmother went to Florida?" Certainly there is very little understanding of the space and time concepts that underlie her statement. The 3-year-old's understanding of "went to Florida" gradually extends through conversation and experience and comes to mean more than just going. As a general rule, when a 3-year-old says, "my grandmother went to Florida," and you say, "well what does that mean?," she means GONE, not another place in the south of the United States with warm weather or any of the other attributes that we might have on it. But using words helps children construct increasingly complex understanding of the concepts the words represent.

The same is true in using computers. Children may seem quite sophisticated in their understanding of a program, but usage in an open-ended program will deepen their knowledge. This is why I think it's so important to have computers in the classroom as well as in computer labs—so the children have a chance to use software and programs over and over, discovering new aspects with each use. For instance, the young child who creates a picture using a computer gains an increasingly complex understanding of the objects being represented in his drawing.

Another perspective draws on the theory of Lev Vygotsky and recognizes that all learning is socially embedded and that its meaning is drawn from how humans define it. Technology then is a social phenomenon as are all human inventions. And the meaning is drawn from and created by people.

Computers are not independent of social discourse but rather simply one of its forms. Children understand its meaning within the context of the values and beliefs of their communities. Because so much of a young child's basic development is unaffected by technology, it's easy to assume it is an unimportant add-on rather than a force shaping development itself. However, this is not the case. Just as differences in cultural practices and language lead to developmental differences, so too do the tools that people use. Literacy, for instance, has changed the way societies organize knowledge as opposed to how nonliterate societies do. Some observers point out that co-construction of knowledge possible through the use of computers in the international community has the potential of changing the framework of thought in all of our communities.

With computers, for instance, young children can enter new realms of experience. Computer networks provide a communication tool for connecting children to all sectors of society. They can communicate with their peers throughout the world and reach out to new teachers as diverse as those in arts and sciences. People—adults and older children—mediate children's knowledge and understanding, socializing in the interconventional representations of symbols. Responsive, reciprocal

social relationships and patterns of communication motivate and structure a child's interaction with the objects in his environment. Even in the age of technology, it is through human relationships, relationships with others, through joint activities, through language, and through shared feeling with other human beings that young children grasp meaning. This speaks to the importance of the human mediators, the teachers, who either confer on computers the mantle of adventure, discovery, meaningfulness, and pleasure or that of drudgery and monotony.

How Do We Assure Equal Access to Technology?

How we structure access to technology then has implications for the structure of society as well as the knowledge of individuals. We must pay close attention to the opportunities different groups in our society have to use computers in various ways, and we must assure that access to technology does not exaggerate the already deep divisions in our society. Currently, this seems to be the case. If we look at the statistics on computer use in school, in 1993 we find that only 16% of African American preschoolers and kindergartners had access to a computer in school as compared to 26% of white children. Similarly, we find that 19% of children from households with low incomes have access to computers, while 33% of children from homes with incomes above $75,000 had access in their schools. And certainly the discrepancy between the computer access of the rich and the poor, between whites and minorities, has increased sharply since 1993.

What does it mean to low-income and minority children not to have experiences comparable to that of other children in their community? Not to have the opportunity for active computer use, for play with computers as tools? I suggest several things. First, they may not have the opportunity to deepen their knowledge about representing ideas with technological tools.

Second, and perhaps even more importantly, they may not think of themselves as technology tool users. Coming from homes that are less likely to have a computer and from families that often have little hope for their children's school achievement, they are doubly jeopardized when schools do not have computers or only use them for drill and practice. A number of years ago, we ran a computer program for children in a preschool center serving low-income African American and Hispanic families. One of our most startling findings was a sense of empowerment that program conveyed to parents. Their children were learning what other children were learning.

Third, children from low-income and minority communities may be further cut off from communication with the mainstream. Learning to communicate with computers is an increasingly important skill, and it is learned through participation. Just as young children need to participate in conversation to learn the ins and outs of oral language, they need to participate in computer talk to learn the ins and outs of this new form of communication. The present unequal distribution of computer technology deprives many children the opportunity to learn the skills and attitudes that underlie the use of technology as a tool and will relegate large numbers of them to the economic and social sidelines.

Given this background, what should we teach low-income and minority children about technology? Or more to the point, what do we want to teach children about technology so that we can attain the social outcomes we seek? I have a list of five recommendations that I think are important to think about in teaching young children about technology.

- *People control technology.* Children should learn that technology is controlled by someone—and that someone could be themselves. They should learn that technology is a tool for addressing personally relevant issues, rather than a medium over which they have no control. Supportive activities would include playing with open-ended computer programs, programs the child can control. In addition, children would take field trips to see how people use technology—people like themselves as well as people who are different.
- *Technology is not just computers.* Technology can take many different forms. Calculators, telephones, and tape recorders accomplish different tasks and operate in different ways. Young children can learn to appreciate these differences. Many of these objects are toys and can be integrated into the play areas of preschool classrooms. Or the real thing can be used in the work areas.
- *Technology has rules that control how it works.* While young children may not fully understand the rules that govern the various technologies,

they can begin to understand that there are such rules. Objects must have a source of power; they have plugs or batteries; computers must have instructions either built in or provided by the user. Children can learn the differences in the power sources and the ways different kinds of technology work. In our program, one of the things that we did was to bring in a video camera and let the children make video pictures and show them to their parents. They made up a story, they videotaped it themselves, and then they showed it on the television screen. One of the little boys said, "See, we're on television!" It was obviously the first time anyone in his family or anybody that he knew had ever been on television, and it was a very different kind of understanding of what is television than if all you see are other people on the screen.

- *Technology has languages.* Interacting with computers involves learning a vocabulary. Loading the disk, attaching the modem—these are the vocabularies the children can learn quite easily. Computer programs also have languages that permit the user to manipulate them. DOS tells you it's listening with a letter prompt, Mac has icons, Windows 95 says start, and Logo has a turtle. Children can easily learn to distinguish different programs, different computer types, and the languages that they use.
- *Computer programs require different ways of organizing thinking.* Some pre-programmed applications (Reader Rabbit, for example) require children to employ a narrow set of skills, matching and rhyming strategies, while more open-ended programs (paint programs, for example) permit a broad range of possible strategies and outcomes.

As I hope I've made clear, I think it's more important for schools or children outside of a mainstream of American experience to have this latter type of computer lesson, the kind of computer lessons that are broad and open and encourage children to think and plan and do for themselves. I have several examples that may help illustrate how computers can enhance or augment school learning for young children in ways not likely to occur without them. Clements, for instance, describes three 6-year-old children who work on a Logo program to construct a hat for a snowman. Motivated by the goal of creating the best snowman, their discussion and actions revolved about the relative size of the drawings produced by inserting various numbers in the program. Thus, their attention was focused on a critical set of relationships. The computer had created a visual reality between the hat and the numbers that neither alone could have done.

We had a similar experience in our computer program. Does anybody know Logo? Well it's a graphics program, and the children can make lines that go in different directions. One of our children discovered that if you punch in enough numbers, the line that you make goes across the screen and then comes back around and doubles and comes back around the screen. You can imagine how absolutely fun that was. The kids all were gathered around, and this little boy who discovered this phenomenon was showing everybody how to do it. One little boy said, "you mean that the higher the number goes the longer the line is?" That is not an understanding we expect from many 4-year-olds. They knew what it was they were doing. It made the learning far more significant than it would have been if we had tried to explain to them how if you make a line long enough it not only goes this way, it comes back around. Let me say that there were not many lessons in Logo that were as clearly beneficial to kids as that one was.

Changes in language usage have been reported as a consequence of computer activity. Researchers from the Erikson Institute reported changes in children's understanding of written communication after they joined a computer network with children from other states and countries. This was a computer network with nine different countries and four sites in the United States. All of the children spoke English or wrote English, so the communication was in English. Each site developed a newsletter to send to each other site. Since writing was the only tool these children had to communicate their ideas and report their findings, they had to think of their writing as different from writing for the teacher.

Children began to hone their writing skills because they had an audience that did not know much of what they took for granted. They would write an article, and then somebody in Finland would write back and say, "what do you mean the temperature was 95 degrees," since they only know about centigrade and it probably never gets to be 95 in Finland. So the kids are constantly having to figure out what might somebody not know about me in

my writing. They had to seriously consider the background information necessary as they collected news and contributed messages to the network.

As children develop their abilities to understand and make use of simple systems, new opportunities occur for technology to affect learning. Computer technology obviously alters the possibility for enrichment and extension of basic concepts beyond what might be ordinarily available in the typical classroom. While it seems clear that computer technology can contribute positively to young children's learning, the more relevant question is under what circumstances will it contribute positively?

Computers do not act alone to affect children's learning. They act in concert with the competencies of the individual and with aspects of the social system in which they are embedded. They interface, for instance, with other symbol systems, within social contexts that include novices as well as those who are more expert in the domain, and they use historically elaborated techniques and strategies. The complexity of the interaction between the tool and its purpose and context makes simple claims of effectiveness suspect. Instead, computer appropriateness must be judged by the tasks to be accomplished, with whom it's to be accomplished, and what institutional setting and which conventions and traditions are going to be observed.

Before I conclude, I would like to say a few words about what computers are not good for. Because recent technological thinking has the appeal of innovation, it's important enough to fall victim to a pendulum swinging away from other forms of human thinking, such as relational, emotional, and certain forms of artistic thought. All are integral to nourish human development in children. Certain types of thinking are more consistent with technology than other forms. Linear and sequential organization of ideas, expression of its symbolic and abstract thought, and discrete categorical systems are among those most consistent with this new generation of educational technology. But while linear organization of experience provides rich opportunities to expand and create new knowledge and understanding, it's not the only way. Within the arts, for instance, there are many different ways of organizing and representing experiences. They are no less valuable because the idea is expressed by the person in singing or drawing or in movement. It's important for children to grasp the meaning of experience through their emotions, their sensory perception, and their bodies. Technological tools are one step removed from the personal.

Conclusion

Predictions of the educational needs of citizens in the 21st century stress the importance of flexible intelligence, rapid shifts in thinking as contexts differ, life-long ability to learn new ways of solving problems. The vision endorses teaching children to be active users of technology rather than simply reactors to it—a vision wherein technology is not simply putting the same old thing inside of a box rather than on a piece of paper or a slate, but a tool for their own thinking. Young children share their community's perceptions of the place of technological objects in the social world and the individual's relationship to them.

There's probably nothing inevitable about the way technology is integrated into the social fabric of our society. It has the potential for many different formulations. Young children can learn that technological skills are socially desirable and expected of them or conversely that such knowledge is exclusive and more available to some people than to others. In contemplating the social context of technology, teachers must be mindful that institutions tend to duplicate current power relationships among people. They must consider the effect, for example, of offering middle-class children opportunities to play with technology and use it as resources for their thinking while providing few such chances for poor children. Similarly, technology can be used primarily as an individual and autonomous activity, or it can encourage cooperation through networking and collaborative activity. Children may learn to view the world as a single truth or as a place for competing perspectives. Children may view computers for individual use or as instruments in joint problem solving. The choice is ours to offer. ■

Families, Education, and the Technological Age

Scott W. Somerville ■

Abstract

This transcription of a presentation by Scott Somerville, an attorney for the Home School Legal Defense Association, discusses the use of technology by families who home school. Issues addressed include the extent of home schooling in the United States, the use of computers by home schoolers; how the home-schooling parent learns to teach; how the parent helps children learn, including a discussion of unit studies; whether fathers as well as mothers home school their children; and whether home schoolers can legally meet and share resources.

■

Introduction

Because I'm an attorney, I always get the opportunity to tell a few attorney jokes. How many of you know the one about the rats? If you know the rat joke, just raise your hand. OK, that's too many—I won't tell the rat joke. You know where copper wire came from, don't you? Two lawyers fighting over the same penny.

My job as an attorney is a little different from normal. I defend families who've chosen to educate their children at home. I cover families in Illinois—so this is territory I know well—and Indiana, Michigan, Oklahoma, Kansas, Utah (I'm still trying to pick up Colorado so I can have a monopoly), Virginia, DC, Maryland, Florida, Northern Mariana Islands, and the Virgin Islands. If anybody here is thinking about home schooling, let me make one request. Please move to the Virgin Islands, start home schooling, and get into legal trouble. In the Virgin Islands, home schooling is completely illegal, but people do it down there all the time. They just say, "Hey, mon, no problem." They have a very laid-back attitude, which is good for the home-schooling families, and it doesn't get the hard-working home school legal defense litigation team to tropical paradise.

I was talking to some folks earlier today and thinking about the Thanksgiving dinner that's coming up real soon at my home. I have six children, and I was one of six boys myself. (My family life's real interesting, and if I start telling West Virginia stories, we'll be here all night.) My six brothers and I get together every year at Thanksgiving, and we have very interesting things to share when it comes to the subject of education. I'm a home school legal defense attorney, I've had two brothers who are private school principals, and I've got two other brothers who have their children in public school, so we really cover most bases. My youngest brother is 22 and unmarried. (I'm not looking for a sister-in-law actively, but if you know any real good ones, we could talk afterwards.)

When we get together at Thanksgiving, there's some real tensions within the family, and I'm going to apologize to my brothers. I've discovered that over the course of the last 10 years of being a feisty home schooler, I've said some things that have hurt my brothers' feelings. Two of my brothers have chosen public schools as being best for their children. Some of the comments that I've made over the course of the last 10 years have been rude, insensitive, offensive, arrogant, obnoxious, and sometimes just plain wrong. This realization came to me recently when one of my brothers explained to me, "Look, it's not easy for me to decide what's best to do with my 6-year-old son. I looked real hard at home schooling and thought real hard about private schools, and I finally decided to pick what I think is a real good program here in our county. And I just feel like you're going to reject me because of things you've said about

public schools." I realized that my own tendency to be pompous, arrogant, and other things that lawyers are so good at sometimes made me forget that this is a human being here, that the school choice that we make is a personal one, and it's not something that I should just casually joke about. So I made a commitment to myself saying, "OK, I've got some real differences of opinion with folks who believe that public education is best for all children—and I am certainly going to be open about that—but I don't have to be nasty about it." I would like to apologize on behalf of the entire home-schooling community for any arrogance you may have ever heard. A lot of home schoolers, you have to understand, believe that they're making a difficult and dangerous choice for their family.

Home Schooling, the Law, and Public Schools

When home schooling started, when my organization, the Home School Legal Defense Association, started back in 1983, it was just plain illegal to home school in most states. Illinois was not one of them. Home schooling has been legal here since 1950. But elsewhere it was just plain illegal. You would be charged with truancy, and you might be put in jail. Michigan was busy prosecuting home schoolers up until 1993, I think, when we finally won a supreme court case up there. Iowa was prosecuting people cheerfully up until 1991. My boss Mike Farris was in front of the North Dakota supreme court seven times until they passed a law in 1991 legalizing home schooling. So there are a number of home schoolers who really do believe the public school officials are out to get them. And that's based on recent history.

There are also a lot of home schoolers who have had a bad attitude towards public schools. In addition to feeling like the government is out to get them, they also feel quite honestly that the educational establishment has too much power to crush the competition. If the Ford Motor Company could design rules for Honda imports, we wouldn't necessarily expect Ford to design rules that would be good for Honda. A lot of times, the home schoolers feel that state departments of education, local school boards, or truant officers are much more interested in protecting the public school than in being fair. So that's where a lot of the home schoolers are coming from. If you've ever heard a bad attitude from a home schooler, I apologize.

Home Schoolers and Technology

I would like to share some things tonight from the home schooler's perspective that have to do with our theme, which is technology. There are things that home schoolers are free to do in seizing the new technologies that are available that public schools really aren't free to do. How easy is it to get one school district to implement a new technology? It isn't easy. To get one home school family to take advantage of a new technology is real easy. You look at it, and you say, "Well, maybe that'll work." You pull out the checkbook and say, "Well, I guess we got that much," and bam! you've got the new technology. Home schoolers are free to react, respond, and take advantage of new technologies and are doing so. What I hope to be able to do tonight is to share some of the things that the home schoolers are learning—some of our successes, some of our failures—so that folks who are running much larger school systems can learn from some of our successes and from some of our mistakes—because we make plenty of both.

The reason I think that home schoolers have a lot to say to the education community at large is because we've got a lot more freedom than institutional schools do—freedom to succeed and freedom to fail. We're accountable to ourselves and therefore have a kind of freedom that's kind of scary sometimes. In this world of technological change, this kind of freedom is very informative. I'm going to make one suggestion—keep your eyes on the home schoolers. Whatever you're doing—whether you're running the library, whether you're an advocacy group, whether you're running a local school district or part of the Department of Education, or whether you're a university or wherever you come from here tonight—I really encourage you to just kind of keep one eyeball peeled and watch what the home schoolers are doing as far as technology goes.

I keep talking to journalists who are studying education and the Internet, and each time I get a chance to talk to them, I say, "Have you looked over the educational resources on the Internet?" They say, "Yeah, that's why I'm writing the article." I say, "Have you seen anything about home schoolers?" And they say, "It looks like most of the people on the Internet are home schoolers." You type "home school" on a Web search, you get 200,000 hits, and that was a year ago. I think it's up significantly since then. Home schoolers are

aggressively seizing the Internet, multimedia, and other new technologies because, let's face it, one thing that your average home school mom has is job security. My wife and I have six kids, and the youngest is 6. Nobody is going to put us out of a job here for quite a while. We're not worried about automation. What we're looking for is a labor-saving device that enables one mother to do a good job of teaching multiple children, and because of that need, these new technologies are fascinating and exciting. That was a little lead-in to who I am, where I'm coming from, and what I hope that home schoolers would have to share with this audience.

Audience Questions

I'd much rather hear what questions you have, and make a good faith effort to answer them, than to either put you all to sleep or risk incurring your wrath, because frankly there's just too much ripe fruit in this room for a home schooler to stand up and irritate a bunch of folks who mostly serve the public school community. Does anybody have any questions that a home schooler's perspective on these technologies might be able to help?

What is the extent of home schooling across the country, and of those people who are home schooling, how many of them do aggressively use technology?

All right, quick home school demographics: Home schooling has been growing at a rate of about 15 to 20% per year for the last 15 years. Most recent estimates are that 1.2 million students are being educated at home. If home schooling were a state, we'd be larger than New Jersey and just after Georgia. If we were a single educational system, we'd be the 10th largest state. The home-schooling community is a little better educated than the average American and slightly more affluent, but not much. About 50% of home schoolers make between $25,000 and $75,000 a year. A bare majority of home-schooling parents—one or the other—has a bachelor's degree. In the 1980s, home schoolers were predominantly evangelical Christians, but that's rapidly changing. The home school population is becoming more and more diverse every day. There's rapid new growth amongst Roman Catholic home schoolers and traditional yuppies (if I may use a slightly derogatory term). Lots of folks are coming into the home-schooling community other than your Bible-Belt Baptists.

In a recent survey, I think about 34% of U.S. households had a computer in the home, and of those, about 26% of U.S. households had children using a computer in the home. That's what I remember. (If anybody's got more current figures, correct me.) Within the home-schooling community, I believe 86% of home schoolers have a computer in the home, and 85% of home schoolers have children using the computer in the home. Computer use amongst home-schooling families is easily triple that of the American population at large.

Most home schoolers are trying to find good educational software. I'll be openly critical—there isn't much good educational software. Most of the home schoolers who have older children are using the Internet trying to find distance learning and other resources that are available. I've got six kids, and we've got six computers at our home. We haven't got a network set up—that's the next real project. But it's very common in home-schooling circles to have not one but two or even three computers because mom uses that computer and the kids are on that computer. And if you're like Mike Farris and have 10 kids, you've really got to keep buying more technology. The home-schooling movement as a whole, although not computer sophisticated, is using technology aggressively. As a political movement, we're also very heavily involved in using the Internet to try to communicate. We've got a bunch of politically active people who are using the Internet for organizational purposes as well as for educational purposes.

How about the home school teacher. How does the home-schooling mom typically learn how to teach?

I'm going to answer that question two different ways—learn to teach at all, first of all, and then learn to teach technology. The best way to learn to home school is to start with a 4-year-old. This is the ideal way because you know more than they do. Then you just try to stay ahead of them.

When it comes to technology, basically you've got the same answer. My wife started out very computer averse. She got her first computer because she needed to be able to print out her lesson plans on a regular basis. "I just need a word processor," she said, "so I can type out what I'm going to do and just change this and change that and print it out so I don't have to sit down and rewrite everything every time." Well, that was about 10 years ago now, and since that time, she's gone

from just using the computer to type in a lesson plan to the point now where she's got a Pentium 166, she's online with about 40 new e-mail messages every day, she's got five or six different software packages that she can just cook on, and she's got her database running. All of this has come about because she started with one practical need and grew from there. If I can generalize from that experience, I would pass this tip on: one of the best ways to get real people to learn sophisticated skills is to start them on very simple skills.

I wrote an article for a home-schooling magazine 5 years ago, back when almost no home schoolers were on the Internet. I was talking about the Internet, talking about modems and telecommunications, and I made this one very simple suggestion. I said, "Call your local library and see if their card catalogue is online." Then I went through step-by-step directions on how to get a cheap modem so that you could dial into your library, because to the home-schooling mother, this is an absolutely vital need. If you've ever tried going to a library with three or four small children waddling around your feet while you're looking for resources, you know that it's tough. If you've ever been a librarian and seen some poor haggard parent coming in trying to pick good books for the children while they are bouncing off the shelves, you know that it's difficult to pick good resources and also to be a good babysitter and caretaker at the same time. I wrote this little article and just said, "Here's how you do it." I had tons of people saying, "Thank you so much for that simple suggestion." They got the modem, they logged on, they used the library, but then once they broke that telecommunications barrier, the world was their oyster. A lot of those people who got started 5 years ago just looking at a card catalogue are the e-mail queens right now. They pass on all the funny jokes and all the other things that you folks know about—e-mail culture. If we start with something real simple that works, that meets an immediate need, and then we trust people to grow in their skill and sophistication, I think we'll find that a lot of education takes place.

How does the home school mom who comes from whatever walk of life learn what to do to create in children the desire to be intellectually curious, to problem solve, and to go on and learn. One tool for that is technology and the Internet. That's fantastic. But in the meantime, how does that home school mom know that isolated skills learning is not necessarily the best and how does the home school mom access the knowledge about education that she should be using?

There's something that is very, very popular amongst the home-schooling community at large, and it's called unit studies. That's something that a lot of educators already know about. Something that is continuously reinforced among the home-schooling community is instead of just getting a textbook and plunking it down and saying, "OK, we're going to do so and so today," to try to design an entire family-based curriculum around one item of interest and then pursue that through all the different disciplines and see where it comes out.

The best example that I've had is in my own family. My wife, who was a history major, loves that subject, but she's trying to teach six children about events leading up to the Civil War. She's trying to go from something that she had been studying to the whole state of the United States leading up to the Civil War. She did a unit study on cotton. She simply took cotton and began learning about it—learning about Egyptian cotton, talking about the pyramids, digging in some books about Egypt and its culture. Then she got into the state of our Union back in 1810, 1815, or so and how all of the southern states—Alabama, Mississippi, Louisiana—were basically unsettled. She got into Eli Whitney and the cotton gin, how that revolutionary discovery in 1796 changed cotton farming from a luxury crop that only a handful of people could afford to a very cheap fabric that everybody wanted. Then she looked at the cotton gin and all of southern America and this plant, and she brought in the story of African American peoples, talking about the slave ships that brought them over—talking about traffic in human lives. My own family was run out of Alabama in 1960. They burned a cross on my father's lawn, fired him from the church that he was in. So we tied in my own history, my own family history about being part of the Civil Rights Movement. We put all of that together in this one unit study on cotton. Boy, did my kids learn a lot about cotton. And about America. And about what it means to be an American.

Unit studies are a very popular subject amongst the home schoolers who are trying to break out of traditional ways of thinking and textbook-dominated education into a kind of education that really brings the whole family and all of life together into a learning experience. The Blondins are going to be

sharing their experiences with us a little later and can expand on this idea.

Here's another generalization I think I can share with everybody: Education is life. Education is life, and one thing that's easy for home schoolers to do is just to take everything that happens and tie it all back in together into our life. It's a little harder for a professional educator who comes in and has a schedule and a set time to be able to communicate that everything that we're learning, and everything that we're doing, is all tied together in a seamless web. We know that's true, but sometimes the institutional setting makes it a little harder to communicate that idea in a way that the children really can grasp. Now, that's a little bit more sermon than direct practical answer, but I hope I gave you part of it.

Are there home school dads?

The answer to that question is definitely yes. Home schoolers are already a minority—2% of school-aged children are educated at home. Pretty much all children who are below compulsory attendance age are educated at home, but that's a distinction that I don't need to push. Home schoolers make up about 2% of the U.S. population, and of those, probably 98% of the primary full-time educators are the mothers. There are at least 2% of home-schooling families where the dad is the one who's doing the teaching and the mom is the bread-winner, and then there's a substantial number of single-parent households where the father is doing the teaching. To be real honest, a lot of single fathers say, "I just can't do that. I cannot do a good job of earning a living and do a good job of teaching my children." Whereas a lot of single mothers say, "I have got to provide an education for my child, and I am not going to go on welfare." So it's fairly rare that you see the single father doing the teaching, although it does happen.

I think the real unsung heroes in our culture today are the single mothers who seem to me to be trying to do everything because they have to. I am amazed at the number of single mothers who have taken up the challenge of earning a living, teaching their children, maintaining a home, and trying to stay sane at the same time. There are a lot of families like my own where my wife does about 70% of the teaching and I do about 30%. But I would still have to give her the credit for doing the lion's share of the teaching. So I hope I'm honoring my wife. Home schooling is a women's movement. And the fact that the mainstream press has not picked up on that fact, in my opinion, just shows that they're a little blind to one of the most profound women's movements of the late 20th century. Home schooling is a great women's movement because with 1.2 million children being educated at home, and quite successfully, these women who are doing the lion's share of the work are leaving a mark on American society.

Do home schoolers ever get together and do co-oping or sharing resources and so forth or does that break laws?

Well, you're asking the right man, and in some cases, it does break the law. In Maryland alone, which is where I live, there are about 200 groups like that called umbrella schools. A brand new one just started up that is predominantly African American. The child care administration came and told that school they had to shut down. They were meeting together on Thursday mornings from 9 until 2, and the child care administration said, "You can't do that. You're breaking the law." One part about being lawyers is setting people straight, so we solved that problem real quick.

Let me talk about the home school community as such because it's very much one of my favorite subjects. Home schoolers get together like crazy. Everywhere you go, there's a local home school support group. There's probably three local home school support groups that are serving home schoolers right here. They tend to have monthly meetings. They tend to have newsletters that come out every month or two. They usually have a curriculum fair as an annual event. They often have drama classes and field days, and many of them will have graduation ceremonies at the end of the year for those kids who are graduating. It's a combination of an opportunity for social events and help with some of the more challenging subjects.

In my own community, we're part of something called the Family Schools Program. There are 250 kids that are part of our private home school program. Every Wednesday afternoon, all the students file out of the front doors of this private day school, and 250 home schoolers file in the back door of this same school at the same time. My oldest son is teaching the little kids' phys ed class, and my second son is in the drama club. All six of my kids are participating in different things that are

all being done simultaneously. That's what the umbrella groups and local support groups do.

There are also things that we call co-op schools, which are two or three parents who are team teaching. That's an area where single mothers in particular find that they can get two or three single mothers together to pool resources—one will teach all day Saturday, one will take the morning shift, and one will come in and try to fill in the cracks. In Illinois you can do that, in Indiana you can do that, in Michigan you can't do that. In Colorado you can't do that unless you file under a special form. So the laws do get kind of quirky fast, and people call us up all the time saying, "Can I have my sister teach my child in her home?" And the first question asked is, "What state are you calling from?" You have to remember that education is the most local of all local issues, and the education laws (I speak as an education lawyer) are always defined by the state and often by your own local school district.

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People Make Dreams Come True, and Technology Expands the Possibilities:

An Educational Journey across the United States

Mark, Betsy, Donald, Kelly, & Stacy Blondin ■

Abstract

A 9-month educational journey of the United States undertaken by the Blondin family revolved around a unique learning experience that incorporated current technology. Their three children were enrolled in Northwest Academy in northern Michigan, a science- and technology-based public academy for grades 6 through 12 that supported their plan to use e-mail and create a family Web site on the Internet as they traveled. Equipped with a laptop computer and a digital camera on loan from Northwest Academy and a desktop computer installed in their motor home, the Blondins began their technology-based travel school. The Web site was designed so students anywhere could tune in, share, and learn through their experiences and interact with the family. The family traveled more than 25,000 miles and visited 40 states. Reading, computer time, Web site building, e-mail, schoolwork, saxophone playing, and major discussions filled the travel hours. Using the Internet to communicate and build a Web site resulted in opportunities to meet interesting people. The Blondins became very creative in finding a phone jack for accessing the Internet with their laptop computer. These interactions and the educational nature of the project led to many discussions on education, technology, and where it is all headed. Reflecting on their journey, the family expressed their joy of learning and experiencing so much of the country together, noting that a few short years ago the project would not have been possible. They also noted that the possibilities for the future of technology in education and the role of families therein are infinite.

■

A Typical Day

No two days are the same. Some days we are traveling, and many days we are out exploring. We visit museums and historical places. We explore the great outdoors and study plants and animals. For example, today we woke up about 8 o'clock. Donald, Kelly, and I went for an early morning swim. We swam for about 2 hours. For lunch, we ate soup and sandwiches. We went into Tucson to the visitors' center and gathered up a bunch of information on Tucson. Next, we went to see about being extras in Kevin Costner's movie, The Postman. *Afterward, we went back to the motor home. Kelly, Donald, and I did about 4 hours of schoolwork. Kelly and I did math, Spanish, language arts, and read some of* A Wrinkle in Time. *Kelly and I took our golden retriever, Buddy, for a walk. We saw some jackrabbits and two roadrunners. For dinner, we ate scrambled eggs and toast. This lifestyle would certainly not be for a person who likes a routine.* (Stacy Blondin, January 31, 1997)

Took my first shower in the motor home this morning. I think we should search for places to stay that have showers. The water barely comes out of our shower, and you have to continuously turn it on and off to conserve water. Our parking place here is great. It overlooks Coe Lake in Berea. There is a gazebo, a path through the woods, and a swimming pool near us. Buddy seems to be doing all right; maybe it is possible for him to go with us on our trip, after all. Today we're going to University Circle where there is a museum, a library, and an art institute. (Donald Blondin, Cleveland, October 6, 1996)

Today we got up, got all ready, and left for Plimouth Plantation. It was neat. The people

dressed up and talked like they did back then. It was cool. You could go in and see what the houses used to look like. We saw a blacksmith making hooks and people putting straw roofs on houses. We talked to one lady, and she didn't know what a restroom was. She thought it was a room where you rest. Later we went to the Plymouth Rock. It was no bigger than a couple of bean bag chairs. Then we went back to our campsite and took Buddy for a walk. (Kelly Blondin, October 24,1996)

Getting Ready

Who has never dreamed of an extended journey with family, friends, or someone they love? Stepping out of the routine, taking off for a month or two, or eight or nine, exploring a state or a country, hiking a major trail, canoeing or sailing a waterway—these kinds of dreams must occur to most people at some time in their lives. But layers of "can'ts" and "why nots" prevent us from making them come true.

Sometimes, when the desire is great and the circumstances are right, reality comes out of such a dream. That's how it was for us, the Blondin family. We are Mark and Betsy (both 43 and married 18 years), Donald (15-years-old), Kelly and Stacy (12-years-old), and Buddy, the golden retriever (2-years-old).

The foregoing quotes are excerpts from daily journals kept during our family's 9-month trip around the United States that began in September 1996. It could be described as one of the longest field trips ever, school on the road, or as we affectionately labeled it, "our odyssey-educational adventure-vacation-journey thing."

Our multisensory learning experience took place in 40 states, big cities, small towns, and national and state parks. Museums, aquariums, science centers, and observatories became our classrooms. Navigating and living on the road provided intrinsic practical learning opportunities.

Timely circumstances and life-altering events made our adventure possible. What made it different from other extended explorations of our country is technology. We incorporated use of the Internet, a family Web site, e-mail, and computer software resources in our journey. That utilization of current technology not only enhanced our experiences, it also helped our children attend school in northern Michigan while we traveled.

After experiencing some disappointments in our local school district's academic standards, we had enrolled our children in Northwest Academy for 1996-97. It is a charter school for grades 6–12 with an emphasis on science and technology located in a town neighboring ours. The school was beginning its first year of operation.

By August 1996, after we decided to make the trip, we began to consider home-school options and to explore curriculums. We started searching the Internet and talking to people we knew who were home schooling their children.

A turn of events occurred when Mark and Donald attended an orientation meeting at Northwest Academy and explained to school staff that the Blondin children might not attend school there because of our planned educational adventure. An enthused discussion followed that included innovative ideas about the educational and technological possibilities our trip presented.

Our journey provided an opportunity that was mutually beneficial to the school and us. We took the curriculum and textbooks for sixth and ninth grades, and our children did their traditional schoolwork along with their nontraditional learning experiences. We tailored subjects like science, social studies, and history to fit our location and activities.

As part of our unique relationship, the school loaned us a laptop computer and a digital camera so we could communicate with and build a Web site for students and staff at school to access and use as a learning tool.

The Role of Technology

On September 30, 1996, armed with the laptop computer, the digital camera, and our desktop computer installed in a 34-foot motor home, we left home in Boyne City, Michigan, for our trip around the United States. We left Flint 4 days later after visiting family and saying long good-byes.

Today I guess you could say we started our journey across America! We left about 3 p.m., and 5 miles down the road the motor home completely shut down. We pulled over and tried restarting the engine a few times. When that didn't work, we called a mechanic. He came about 2 hours later. A loose fuel line; that's what was wrong with it. So, at about 7 p.m., we finally got going. We stopped at a gas station to fill up the gas tank. As my dad got out, he said, "Well guys, the saga continues." We had a flat tire on

the tow dolly. So we got it fixed at the gas station across the street. As we tried to drive the van onto the tow dolly, the van wouldn't start. Then when it did and we pulled it onto the tow dolly, we bent part of the bumper off. We fixed that and were finally on our way to Cleveland, Ohio. (Stacy, October 4, 1996)

Deciding what to take and pack for the adventure was challenging, and though we knew what technology we would use, it took more thought to decide what standard equipment and materials we would include. A dictionary, thesaurus, atlases, calendars, English grammar and science reference books, novels and nonfiction books, and audiocassettes and CDs were packed in motor home corners to supplement computer resources. Also included in our arsenal were a video camera and a 35mm camera.

We considered using computer software exclusively and leaving hard-copy books at home to save space. Not always having electricity or wanting to rely on the generator for computer use, though, we were happy to have the dictionary, road atlas, and old geography book with us.

Technology enhanced our adventure in terms of Internet access, extensive e-mail use, building a family Web site, software research capabilities, and by helping to obtain admission to many places we wanted to visit along the way.

Our Web site documented the places we went and what we learned. Developing the site provided a constant direction and helped us maintain a focus for our adventure. We hoped that students at Northwest Academy and at schools around the world would access our site, read about our activities, and access Web sites of educational places to which we provided links.

After a couple of months of learning, Donald and Mark took over the construction of our Web site, which was started by Shawn and Donna Powers of PowerNet in Indian River, Michigan, prior to the start of our trip. North Central Michigan College donated space for the site, and North Central's media center staff, particularly Eric Grandstaff (who was instrumental in establishing northern Michigan's early Internet connections), was extremely helpful in getting us started. PowerNet's and North Central Michigan College's help with our Web site is a commendable example of the way communities can work together to provide educational opportunities through technology.

Indeed, students at Northwest Academy and students in Boyne City did access our Web site, follow our adventure, and send us feedback. When a student visits our Web site, he or she can link to and explore places like the Metropolitan Museum of Art, Aquarium of the Americas, Plimouth Plantation, the John F. Kennedy Library, or the Portland Museum of Art.

Another positive outcome of using the Internet and building the Web site was our ability to exchange admission to some of the museums, attractions, and events we wanted to attend for mentioning the organizations on our Web site and providing a link to theirs. This exchange enabled us to see and do things we could not have otherwise afforded. When you consider admission fees to many museums, aquariums, and parks for five people traveling the country for 9 months, the total is astronomical. We simply could not have had many of the educational experiences without this advantage.

Just a few places that provided us complimentary admission because of our educational project and the Web site were the Great Lakes Science Center, the Rock and Roll Hall of Fame, the Museum of the Rockies, Seven Seas Whale Watching Line, Oregon Museum of Science and Industry, and the Oregon Coast Aquarium.

In numerous ways, e-mail was an invaluable aspect of Internet access during our adventure. First, it allowed us to keep in contact with family, friends, and school as we traveled. That contact helped us feel much less lonesome, and our children could keep up with news from friends and teachers. Also, we could send and receive messages from a family member who was collecting our "snail mail" and be informed of any urgent correspondence.

Second, e-mail provided a method of finding things we needed along the way. A prime example is the way we found a home for Buddy near Seattle while we went to Hawaii. It's not an easy task to find someone to adopt your family dog for a month, but we did it by using the Internet and e-mail. Through a golden retriever mailing list, we contacted a golden retriever lover and breeder in Morton, Washington, who knew of a young man near Seattle raising his own golden retriever puppy for a 4H project. He was willing to care for Buddy to earn money for his puppy-related expenses, and the

family had room in their yard for our motor home, also! Things could not have worked out better for Buddy or us.

We received meaningful messages from other golden retriever owners as well. As a result of the list and e-mail, we were able to later stop in Chateau, Montana, to meet a golden retriever owner who had 7 adult goldens and 10 puppies! That was a treat for the whole family.

Another surprising advantage of e-mail was receiving messages of encouragement and moral support for our odyssey. There were times we had doubts or became discouraged by tedious travel chores. Just about then we would receive e-mail from someone who admired what we were trying to do, someone who had done something similar for their children, or someone who wished they had. When such communication occurred, it recharged our weakened batteries to full power.

Whenever we needed to send or receive e-mail messages or add to the Web site, we had to find an available phone line. This led to asking people in all types of businesses, from computer stores to Laundromats, if we could temporarily connect the laptop to their phone line.

> *Dear Journal: We got to Portland and started looking for a place to park. We were also looking for a place to get on the Internet. We found a place to park at a police station. It was very windy out. Well, after we got settled in, we went to the YMCA looking to get on the Internet, but for some reason, it wouldn't work. For dinner, we had lobster. It was good tasting, but disgusting looking. . . .* (Kelly Blondin, October 14, 1996)

> *Dear Journal: Today was not my favorite day, but it was okay. We spent half the day looking for a place to check our e-mail and were successful. Then we went to the Portland Museum of Art where we saw some neat artwork by Winslow Homer, Andrew Wyeth, etc. Later that night we went swimming while Dad and Donald went to Maine Internet Connections. Kelly and I had lots of fun playing at the pool. We slept once again at the college police parking lot.* (Stacy, October 15, 1996)

As we searched for phone access, we met many fascinating people and enjoyed conversations about their lives, their homes, our adventure, and technology and education in general. This experience turned out to be a challenging and fun aspect of our trip.

Lastly, the Internet, in addition to the computer software we had, allowed us to research places we were going to explore and topics Donald, Kelly, and Stacy needed for schoolwork.

We accessed the Internet, for example, to find information on the planets when Kelly and Stacy worked on a report for math. They used Encarta software for additional information, and Microsoft donated programs we used extensively. World Atlas and Maps and Streets Plus were utilized by all of us along with our hard-copy atlases and maps.

Kodak gave our school a discount on the purchase of the digital camera and also sent us some sample transparency film, photographic paper, and inkjet snapshot paper. The digital camera was an indispensable tool for construction of our Web site. As much as we used the digital camera, we also used our video and 35mm cameras.

A good example of our use of traditional technology is the videotape we made at Big Bend National Park. Big Bend is snuggled into a corner of southwest Texas, and there is more access to nature than modern technology there. Only people with satellite dishes were receiving information during our weeklong stay. Because of snow in the park, even mail delivery was interrupted. Although we enjoyed our quiet, outdoor time at Big Bend, using the laptop to receive e-mail and news and weather information did help us feel somewhat connected to the rest of the world.

The video camera provided a means for us to make a tape for the students at Northwest Academy about the geology, plants, and animals in the river, mountain, and desert environments of Big Bend.

This wondrous national park was unanimously one of our favorite places, and our total experience there illustrates the multisensory learning opportunities our trip provided. The knowledge we acquired at Big Bend helped us understand many places we explored later.

> *Dear Journal: Today we got up, and it was my day to decide what to do. Well, I decided to hike the Lost Mine Trail. The trail was up in the Chisos Mountains, so we arrived there about 11:00. We arrived at the top of the trail about 1:30. We spent about 40 minutes at the top. The trail was supposedly 5-1/2 miles, but straight uphill. We made it back down in about 45 minutes. When we got back, we did some laundry. For dinner, we had barbecue chicken in tortilla shells. There was*

still snow on the Chisos. There is a legend that there is gold in the mountain. (Kelly, January 9, 1997)

Learning Experiences

In many ways, our adventure successfully combined current technology, older technology, such as the video camera, and traditional resources, such as reference books, lectures, and hands-on activities.

The five of us spent much of our learning time together. Many of our multisensory learning experiences took place at big name attractions and popular places, but others occurred spontaneously and naturally along the way. Out of countless examples, one is a stop we made at a rest area to take a break and change the oil in the motor home. The rest area was also a wildlife preserve, complete with signs and explanations about the marshy environment and its birds and animals.

...we drove back to the motor home for last-minute boat supplies, and then we were off to the whale-watching boat. There we boarded right away and set off at one o'clock. The boat drove 17 miles east to a large bay, which I have forgotten the name of. We saw almost 40 whales. It was spectacular!!! There were humpbacks, fin whales, and minke whales. They were feeding, and we saw a couple with their mouths open. They were awesome! None of us got seasick, which was good. We spent an hour and a half watching all the whales play and eat. During the boat ride, we talked to a biologist named Michelle who worked as a guide and researcher on the boat. She was nice and thought our trip was really neat. Most people think that way, and it is encouraging. We ate another dinner at the motor home and then went to the Hard Disk Café where we saw our Web page. It's coming along great! We do so much during the days, I'm plum tuckered out. (Donald, Gloucester, October 17, 1996)

Today at 8:30 we went aboard and toured a schooner called the Adventure. *The ship was first used for fishing in 1927, and in 1954 it was converted to a windjammer and began giving sailing trips that would head out to the ocean for a week at a time. The boat is now a historic landmark. The tour gave you a good idea about what life was like during the major fishing days in the 20's and 30's. It was not a job I would have chosen! After settling in [our campsite], we drove around the island seeing Halibut State Park and the "paper house." The house was awesome—completely made of paper except the floor, roof, and chimney. Even furniture was made of tightly rolled and varnished newspapers. The desk had articles about Lindbergh crossing the Atlantic. The home was built by Elias Stenman, whose hobby was building using paper (obviously). He started building in 1920 and actually lived in the home for 5 years. He began by insulating the home with newspaper. When the paper did well through the winter, he decided to go crazy and build everything using newspaper!* (Donald, October 18, 1996)

Several places we visited were natural learning classrooms. Snorkeling in Hawaii allowed us to swim with dolphins and sea turtles and identify tropical fish, marine animals, and many kinds of coral. Exploring tide pools and rocky shoreline areas on the East Coast led to detailed discussions of the moon, tides, and succession. Later, at McDonald Observatory in Texas, we learned again about the role of the moon in Earth's tidal activity. Stacy and Kelly put together an amazing shell collection in Florida, and while in Sarasota, we visited Mote Marine where we easily related to the exhibits. At Big Bend National Park, we joined a ranger-led driving tour of the park that highlighted the area's geology, plant, and animal life. There we were able to see the obvious results of plate tectonics, volcanic activity, and the effects of erosion.

The variety of cultures, ethnic groups, and socioeconomic divisions in our country was ever present in our explorations. In large cities, we were constantly reminded of the diversity that makes this country great. At the Texas Institute of Cultures in San Antonio, the theme of the introductory film and exhibits was how different groups of people played important roles in the development of Texas and, in turn, our country.

After having been to Ellis Island and the Statue of Liberty in New York, we observed immigration issues currently causing rifts in communities of the Southwest and Southern California with greater insight. This understanding enhanced our discussions with family and friends in the Southwest about immigration and cultural diversity.

Sometimes, particular locations would illustrate the stark contrast between the "haves" and "have-nots" in the United States. One day we left Monterey, California, for a drive to Pebble Beach and a famous 17-mile stretch of coastal road. Shortly after observing street people panhandle in Monterey, we

saw multi-million-dollar homes with views worth even more perched above the coast.

A particular 24-hour period will forever remind us of the variety of learning opportunities available in this country. One day we visited the McDonald Observatory outside Fort Davis, Texas, and were given a red-carpet tour by wonderful staff people. That night we attended a star party and marveled at celestial wonders high above Earth. The next day we visited Carlsbad Caverns in New Mexico and went far below Earth's surface to explore the geological magic.

Shortly after that experience, we visited Los Alamos, New Mexico, and the Bradbury Museum. Our experience was special in that we spent the morning with a research scientist discussing nuclear power, DNA testing, and a variety of subjects. We conducted an experiment with DNA that showed how it is used in crime investigations. It was a one-on-one experience that gave science a fascinating and friendly face.

Our trip was full of daily observations and natural, spontaneous education. During our 2-week stay in Washington, DC, we had a nightly commute back to our campsite. We stopped each night at a local 7-11 store to get an Internet connection and soon developed a game. Questions would be asked about the places we visited that day, and correct answers were worth a slurpee. We were all winners, and it was amazing to see how much knowledge everyone absorbed.

We were in our nation's capital for the Veteran's Day celebration. On November 10, we visited the Vietnam Memorial and then took part in the Veteran's Day ceremonies the next day at Arlington National Cemetery. After the President's speech, we walked to President Kennedy's gravesite and then through the massive cemetery. A week later we toured the Holocaust Museum. While visiting Washington, we had rich discussions about our nation's history, sacrifices made for freedom, and the injustices man inflicts on his fellow man.

> *Today we went to the Bureau of Printing and Engraving. We saw how money is made. I got a key chain with shredded money in it—$50. After this, we went to the Holocaust Museum. We learned about Hitler and about the concentration camps. We also learned about what they did to people who they thought weren't perfect.* (Kelly, November 18, 1996)

Practical matters like map reading, trip planning, and obtaining fuel, water, power, and food became daily concerns. Negotiating skills and compromise were integral parts of our lives when we made decisions about what to do and where to go. Long-range planning involved complex equations of miles, fuel, possible destinations, and everyone's interests. We all became adept at everyday decision making.

Computer Use on the Road

In terms of using computers and the Internet on the road, we felt like pioneers, entering and exploring new territory. Progress in technology is at various stages and differs as much from location to location as people do. We often experienced difficulty in finding places where we could hop on the information highway. A librarian at the University of Maine in Portland said, "Maybe the country is not as wired as we think it is." He was right. At home in northern Michigan, local progress and easy access had spoiled us.

In Scarborough, Maine, we found a public library very well equipped and online, but in New Orleans, the public library had not yet begun the process. Minuteman Science and Technology High School in Lexington, Massachusetts, had just built a tremendous computer lab, was in the advanced stages of being wired, and at the time we visited was preparing to participate in a nationwide Internet Day.

We found only one public modem access location easily, and that was a kiosk in the Honolulu Airport. There you could bring your laptop and connect as easily as using a phone booth. Several hotels have wonderful media rooms with modem access, computers and printers, and fax machines. We used one of those in Sioux Falls, South Dakota.

Some private RV parks advertise telephone service, and though we thought we would be able to access the Internet at these places, many of them offered phone access only for long-term guests. At three or four campgrounds, we had phone access, and it was a true luxury!

Internet cafes are sprinkled throughout the country—we visited three or four—but some did not have extra phone lines to access. We could work on the Web site and check e-mail through their computers, but they normally charge hourly fees. At two of these cafes, we were treated like royalty, given free online time and a lot of attention because of the interest in our project.

Multimedia stores such as Kinko's did not usually have phone lines available for the laptop, and they charge an hourly fee to use their computers. At the time we stopped in one of these types of stores, they were just installing extra phone lines for modem access purposes.

Lessons Learned

As we traveled and conversed with people, we kept hearing that, in general, students and school staff did not seem to have enough training, access to, or time on computers to browse Web sites such as ours and take advantage of what is offered on the Internet.

From our own school, we heard that computer time was being limited because students were misusing computer access, and sufficient supervision was not feasible. We have heard this story countless times; it is a sad situation, but one that can be improved. A unique and wonderful educational resource is not being utilized to its potential.

Some school districts have hired full-time employees to facilitate computer and Internet use, supervise labs, and help staff find efficient ways to use the Internet with their students. Incorporating computer and Internet use in classrooms is a challenge, but it is one we can help each other tackle.

As we traveled, talked and learned, and tried to use all the resources possible during our adventure, we saw many ways in which technology could be used by families, by schools, and by communities in educational endeavors. Although much of what we did was experimental and some of our goals were not wholly realized, many of them were, and we feel the basic concept and ideas were sound.

We have already mentioned how schools, colleges, and businesses can be involved in a project such as ours, and how this kind of adventure could be shared with students all over the world. Educational institutions around the country can take advantage of current and near-future technology by:

- Sharing information more efficiently through mailing lists, Internet resources, and Web sites. Many schools are now online, and students and staff around the world can "compare notes" on countless subjects or conduct cultural exchanges.
- Taking advantage of anyone (student or staff) who travels by allowing students at the school to share his or her experiences through technology.
- Allowing students from all backgrounds and in all economic circumstances to share the wonders available on the Internet.

Technology can allow families to spend invaluable time together and strengthen their relationships by:

- Allowing them to take extended trips any time of year, during which children can continue their regular schoolwork and receive credit for nontraditional educational experiences.
- Allowing children to travel extensively with parents whose jobs require travel or can be done on the road.
- Being a way families can spend time together, using software or Internet sources to do research, word processing, and artwork, or visiting educational places via their Web sites.
- Providing opportunities for parents and community members to volunteer in school technology labs and work closely with students.

The first two points are already possible if parents choose to home school their children, but why not create situations wherein schools can also benefit? Schools could receive funding for those students, and everyone could benefit immensely from assignments shared by students at school and students on the road.

Our fundamental thinking about education would have to change substantially, along with traditional funding methods, attendance policies, and assessment procedures, but some changes are already taking place.

From the perspective of a family who traveled the country for 9 months with the support of a public school, the future holds infinite possibilities for families and education, with all that technology affords us. We need only to find the ways to open all the doors.

In many ways, our adventure was richer than we had anticipated and turned out better than expected. The school year we spent traveling as a family was more rewarding than imaginable. We spoke with people, in person or by e-mail, from everywhere, in various professions, of all ages and in all stages of life, who had made journeys like ours in their lives or who shared our dream of spending more time with their children. Many of

them said that if they had known it was possible, they would have done it.

The message we would like to share is that it can be done. We need to open our eyes and hearts, constantly question what we are doing and why, and use all tools and resources available to make the dreams we imagine come true.

APPENDIX A

Some of the Places We Visited

National Parks

Acadia
Big Bend
Yellowstone
Arches
Canyonlands
Olympic
Glacier
Grand Tetons
Saguaro
Grand Canyon
Badlands
Yosemite
Redwoods
Volcano
Rocky Mountain
Painted Desert and Petrified Forest
Carlsbad Caverns

Special Places

Niagara Falls
Rock and Roll Hall of Fame
Great Lakes Science Center
Boston Freedom Trail
Plimouth Plantation
Ellis Island
Statue of Liberty
Brooklyn Bridge
Wall Street
Jamestown
St. Augustine, Florida
Botanical Gardens (Cleveland)
Schooner Adventure
United Nations
Walden Pond
Quincy Market
Faneuil Hall
Freedom Trail (Boston)
Empire State Building
Today Show taping

National Historical and Memorial Parks

Minute Man and Old North Bridge
Cape Cod National Shoreline
Independence (Philadelphia)
White Sands
Cabrillo National Monument
Mt. St. Helen
Mt. Rushmore
Harper's Ferry

Aquariums

Aquarium of the Americas
Mote Marine
Monterey Bay Aquarium
Oregon Coast Aquarium
Whale watching off the coast of Massachusetts

Museums

Cleveland Museum of Natural History
Portland Museum of Art
Metropolitan Museum of Art (New York City)
Natural History Museum (New York City)
The following Smithsonian Museums:
  Air and Space, American History, Natural History, Postal, Renwick, and National Gallery of Art
Holocaust Museum
National Geographic
Ford's Theater
City of Mobile, Alabama
Fort Conde
Santa Fe Fine Arts, Wheelwright, American Indian

Observatories

Mauna Kea (Hawaii)
Kitt Peak
McDonald

Universities and Libraries

Bennington, Vermont
College of the Atlantic
University of Maine
John F. Kennedy
Harvard
Lyndon B. Johnson
University of Massachusetts
Berkeley

Washington, DC

Washington Monument

Lincoln Memorial
Vietnam Memorial
Korean War Memorial
U.S. Capitol Building
National Archives
Kennedy Center
White House
Union Station
Bureau of Engraving
Arlington Cemetery

Cities

Cleveland, Ohio
Portland, Maine
Boston, Massachusetts
New York City, New York
Washington, DC
Philadelphia, Pennsylvania
New Orleans, Louisiana
Sarasota, Florida
Houston, Texas
Austin, Texas
San Antonio, Texas
Albuquerque, New Mexico
Santa Fe, New Mexico
Phoenix, Arizona
Sedona, Arizona
Las Vegas, Nevada
San Diego, California
Los Angeles, California
San Francisco, California
Reno/Lake Tahoe, Nevada
Eugene, Oregon
Portland, Oregon
Honolulu, Hawaii
Kona and Hilo, Hawaii
Salt Lake City, Utah
Denver, Colorado
Madison, Milwaukee, and Minneapolis, Wisconsin
Chicago, Illinois
Charleston, South Carolina
Provincetown, Massachusetts

Fun Places

Busch Gardens
Six Flags, L.A.
Knott's Berry Farm

Zoos

National Zoo
Houston Zoo
San Diego Zoo

Cultural Entertainment

"The King and I"
"Cats"

APPENDIX B

Some Commonly Asked Questions about Our Adventure

How did you decide to make this trip?

Late in the winter of 1995-96, we saw or read something about extensive travel. Our son says it all began when we watched *Bridges of Madison County* and admired the photographer's lifestyle on the road, but our memories fail us on that point. We thought it would be great to travel the country and show our children the major sights and historical places. We have always believed that if you really want to do something, you find a way. We talked about it a lot and decided that we could do it. As a result of a career change for Mark, we were in the process of re-evaluating values, priorities, and career options. During this time, Mark's father died unexpectedly, and his death confirmed our feelings that nothing is forever and that very few of us get to spend enough time with our quickly growing children. Ours were at perfect ages to handle school on the road for a year and to remember the trip forever. The decision seemed right, and circumstances made the timing ideal. We were also trying to make decisions about school for our children that year, considering moving to a warmer climate, and thinking of returning to college ourselves, so the trip was also about looking for work or possible places to relocate.

How did you manage the expense?

This is an issue most people are curious about. We used our retirement-type savings to fund the adventure. It was and is one of the biggest risks for us, but we think the monetary consequences are worth the experience we had. We kept our house and rented it out for three of the months we were gone. Now we are totally starting over financially. Some aspects of the trip were less expensive than they could have been because we received support from some organizations and free admission to some places we visited.

How did you travel, and how did school on the road go?

We drove and lived in a 34-foot Coachmen class A motor home and towed our minivan. For our desktop computer, we installed a computer station in the motor home. Northwest Academy loaned us the laptop computer and a digital camera (for which Kodak gave a discount) so we could interact with students and teachers and send information and pictures to the Web site. Our children had textbooks and general outlines from school, and they did traditional work in math and language arts. Science, social studies, music, art, and physical wellness fell into place as intrinsic parts of our journey.

How did you all get along in a confined space for that period of time?

Great! We were not as confined as most people imagine. Although we were in the motor home a lot, we were also out of it a lot—sightseeing, exploring, hiking. A few more minor squabbles, along with getting on each other's nerves a little, occurred on the road than would have at home. It was stressful at times, just navigating and accomplishing daily chores, but we knew before we left that our family dynamics and personalities would weather a long adventure.

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applications

In contrast to the general sessions, individual presentations in this strand focused on specific instances of how technology has been used in programs that serve parents, children, and teachers. In most cases, the presenters discussed both the successes and drawbacks of these applications of technology.

The presenters in this strand of conference presentations ranged from film makers (Patty Burness) to those operating community programs (Lillian Coltin and Kate McGuire); from child care consumer educators (Anne Goldstein) to preschool teachers (Melissa Groves, Michele Jarnigan, and Kendra Eller); from parent educators (Walid Elkhoury and Dana McDermott Murphy) to an educator from Estonia (Mihkel Pilv, who described a program using technology to support elementary educators and home-schooling families).

Other presenters focused on Internet resources for military youth facing relocation (Mareena McKinley Wright, Rebecca Schaffer, Kathleen Coolbaugh, Gary Bowen, and Gina Wiley); avoiding the dangers of Repetitive Strain Injuries posed by computer use (Sandra Ubelacker); and creating Virtual Libraries for parents, teachers, and counselors (Garry R. Walz and Jeanne C. Bleuer). The diversity among presenters was strong testimony to the democratization and widespread use of the Internet.

Not included in this section is the paper *Exploring Nature and Science* presented by David Haury.

If there was an underlying theme in all these presentations, surely it was that our growing technological capability is clearly already available to, and used by, not just the corporate world, but also by many of those concerned with supporting families in the raising of their children. Communication, dissemination of research-based information, and national efforts to advocate for and educate "consumers"—in this case, parents—are activities that have undergone subtle changes as use of the Internet has become commonplace at home. Through use of the new technologies, and despite problems related to the major paradigm shift in beginning to use them, those who work with families unanimously agreed that their organizations were able to do a better job because they had adopted and begun to use the new technologies.

Learn & Live: A Documentary Film from The George Lucas Educational Foundation

Patty Burness ■

Abstract

This paper discusses *Learn & Live,* a documentary film created by The George Lucas Educational Foundation and hosted by actor Robin Williams. The film profiles four K–12 school programs that are seeing positive results. In addition to these stories, the film shares insights from experts in education and technology to help explain why the innovations profiled in the film are important in helping to prepare learners of all ages to thrive in a rapidly changing, highly technological society. The paper notes that the film is supplemented by a 300-page resource book that includes essays from experts and practitioners, profiles, and contact information for hundreds of schools around the country that are implementing effective strategies and techniques.

■

Introduction

Providing the best possible education for our children often hinges on a vivid understanding of what the most effective K–12 schools and programs look like. What does effective teaching with technology look like? What does it mean for schools to link classroom learning to the world of work? How are schools transforming themselves into learning centers open to all members of the community, from kindergartners to senior citizens? And why are these innovations important in helping to prepare our children to thrive in a rapidly changing, highly technological society? This documentary film, created by The George Lucas Educational Foundation and hosted by actor Robin Williams, helps answer these crucial questions by telling the stories of four K–12 school programs that are implementing effective strategies and seeing sustained, positive results.

Program Profiles

At Clear View Charter School in Chula Vista, California, Jim Dieckmann and his fourth- and fifth-grade science students use interactive technologies in the context of a hands-on investigation of insect anatomy. Students work in teams to collect insects, use the Internet for detailed research, and prepare content-rich reports using multimedia tools. A two-way interactive video connection with a local university allows students to examine insect specimens through an electron microscope and to share observations with entomologists. This segment models teaching with technology and provides the basis for discussion of the factors that contribute to the successful implementation of technology in the classroom. Additionally, viewers will see a model of meaningful interaction between students and subject matter experts, linked via distance learning.

At Brighton High School in Boston, Massachusetts, students participate in a school-to-career program called ProTech, which enables them to connect their classroom learning with professional working environments. This film segment features the experiences of Reagan, a high school junior who works as an EKG technician at Boston's New England Medical Center. Reagan works with doctors and interacts with patients at the hospital and then brings her experiences and observations back to class. Not only is she able to develop new understandings about physiology and to share them with her classmates, but by seeing the relevance of what she is learning in school, Reagan is also able to clarify her career goals.

In West Des Moines, Iowa, community schools are being transformed into centers of lifelong learning for the entire community. In addition to serving the learning needs of K–12 students, schools in the district are now open during afternoons and evenings, 7 days a week. Classes and workshops bring the entire community together, and residents are showing that one is never too young or too old to learn. This segment shares the experiences of one senior citizen who begins taking computer classes and of one mother who is learning computer skills from her elementary-school-aged daughter.

Shorecrest High School in suburban Seattle, Washington, offers an interdisciplinary curriculum that engages students in real-world projects. Juniors Ryan and Kevin design sophisticated computer graphics for a leading software company, applying knowledge from their math, physics, and English classes. A project manager from the company provides guidance and feedback, helping the students understand how their work can be improved.

Experts' Insights

In addition to these stories, the documentary film shares insights from experts in education and technology, such as Howard Gardner, Professor of Education at Harvard University; James Comer, Associate Dean of Yale Medical School; and John Seely Brown, Director of the Xerox Palo Alto Research Center. These segments help explain why the innovations profiled in the film are important in helping to prepare learners of all ages to thrive in a rapidly changing, highly technological society. The film is supplemented by a 300-page resource book that includes essays from experts and practitioners, profiles, and contact information for hundreds of schools around the country that are implementing effective strategies and techniques and seeing sustained, positive results.

The George Lucas Educational Foundation

The George Lucas Educational Foundation (GLEF) is based in Nicasio, California. The Foundation researches and disseminates information about effective K–12 public schools and programs. Special emphasis is placed on the power of interactive technologies to transform learning and teaching. Further information is available on the GLEF Web site:

http://www.glef.org.

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Making the MOST of Out-of-School Time:
Technology's Role in Collaboration

Lillian Coltin & Kate McGuire ■

Abstract

In 1994, the DeWitt Wallace–Reader's Digest Fund made an unprecedented commitment to school-age care by launching the MOST Initiative—a $6.5 million, multi-year project aimed at systemic community-based change to improve the quality and availability of out-of-school time for children in three cities: Boston, Chicago, and Seattle. The MOST Initiative, designed in partnership with the National Institute on Out-of-School Time (NIOST) (formerly the School-Age Child Care Project) at the Wellesley College Center for Research on Women, recognized the importance of technology as a tool for (1) facilitating communication within the collaboration and (2) disseminating information on both local levels (to parents, children, and community programs) and on national levels (to government agencies, media, policy makers, and advocacy organizations). This paper presents a case study of the various ways that technology has been used by the MOST Initiative. It discusses details that show how NIOST and the three MOST cities increasingly used technology to implement their action plans and offers suggestions on how other communities can use technology to develop similar networks that support out-of-school activities. The paper also includes a listing of national technology resources relevant to the issue of children's out-of-school time.

■

Introduction

Children and youth today cope with a far more complex and challenging world than did previous generations. With schools open for less than 20% of a child's waking hours, and family structures moving toward dual-career and single-parent or blended households, the need for safe, high-quality programming during out-of-school time is paramount, and growing (Carnegie Council on Adolescent Development, 1994; National Institute on Out-of-School Time, 1996). Although changes in welfare legislation mandate increased work force participation by parents, unfortunately the legislation does not provide help in finding or paying for care for children over 6 years old. The existing gap between the supply and demand for school-age care services will continue to increase. The U.S. General Accounting Office announced that "assuming no significant expansion in available day care slots, supply for school-aged kids will meet only 40% of demand by 2002. It is expected to be particularly hard to find slots for older elementary school children" ("National Update," 1997, p. 8). Research indicates that how children aged 5–14 spend their nonschool hours has a critical impact on school achievement, emotional and behavioral development, and long-term success (Miller, 1995; Miller et al., 1990). Yet what we provide as a nation fails to meet the needs of children—school doors are closed after 3:00 p.m., recreation programs don't match families' work schedules, and caring adults are busy working, commuting, or attending to the needs of young children or elderly family members. Even when after-school programs exist, limited resources hamper accessibility, affordability, and, ultimately, the quality of care offered (Seligson, 1997; Seligson & Allenson, 1993).

The Launch of the MOST Initiative

> *The current out-of-school time "system" includes many individuals and organizations that must work together to ensure youth have someplace to go when they are not in school. It is an interconnected system that includes everything from funding for programs, to*

> *transportation to and from activities, to education to develop professional staff for programs. If any of the system's many parts are weak, the availability and quality of out-of-school programs may be compromised.* (Seattle MOST, 1996)

The MOST Initiative represents a community-based, collaborative model for improving the accessibility and quality of care for children in their out-of-school time. This model attempts to facilitate change on multiple levels. On the national level, MOST cities have worked to increase public awareness of the need for out-of-school care and to develop college-level academic programs for the professional development of staff, and they have participated in a national accreditation pilot focused on program improvement. On a local level, MOST cities have worked to increase the number of children served by before- and after-school programs, improve the quantity and quality of programs, raise the amount and quality of in-service training received by program staff, and help provide accessible information to members of the school-age care field.

In May 1995, after 1 year of planning, Boston, Chicago, and Seattle received grants of up to $1.2 million for the implementation of their 3-year action plans. Each city was required to raise local financial support that matched or exceeded the funding awarded for each of the grant years. The size of the DeWitt Wallace–Reader's Digest Fund's support decreases each year, and the size of the local match must increase. This funding approach is intended to motivate a long-term local commitment to support a system of school-age care that meets the needs of the community.

The National Institute on Out-of-School Time (NIOST) staff work closely with each community to provide technical assistance and comprehensive training support. In addition, NIOST facilitates communication between the cities, and with national organizations at conferences, annual retreats, consultations, and training sessions throughout the country for a wide range of audiences. The DeWitt Wallace–Reader's Digest Fund has hired an independent research organization, the Chapin Hall Center for Children, to conduct a multi-year evaluation of the MOST Initiative.

Technology and the MOST Initiative

While MOST is not a technology initiative, two primary tasks for both NIOST and the cities are collaboration and information sharing, both internally and with national audiences and organizations. During the design stage of the MOST Initiative, it became obvious that advancing the computer skills and enhancing the equipment of the collaborators would dramatically increase their ability to share information with each other and with local and national communities.

Within the MOST Initiative, communication is now frequent and detailed, as the cities, NIOST, the funders, and the evaluators become increasingly comfortable with e-mail, listservs, and electronic bulletin boards. All collaborators now have home pages on the World Wide Web. These Web sites facilitate information sharing between groups and represent a powerful tool for the dissemination of research, events, and other resources to people and communities across the country who struggle with the same issues. Locally, each of the three cities will develop databases of information about out-of-school time activities in their communities. Nationally, NIOST has collaborated with the Educational Resources Information Center (ERIC) to establish SAC-L, an online discussion listserv available to all members of the school-age care field. This forum allows NIOST to share what the MOST cities have learned and to learn about projects and approaches in other communities.

Although it is crucial that children and program staff have access to computers so technology can become a part of program curriculums, this access has not been the focus of technology improvements within the MOST Initiative. Rather, technology is viewed as contributing to the MOST Initiative's goal of building community systems that will support and improve children's access to high-quality out-of-school programs. While it is hoped that other organizations within these community systems will take up the challenge of increasing computer access and knowledge at the program level, MOST focuses its work on developing the use of technology as a tool that can advance the communication, efficiency, and information sharing of collaborating partners. MOST also hopes to facilitate the provision of timely and accurate information on topics ranging from program location and activity content to standards of care and available staff training, so that large numbers of people and

organizations both locally and nationally are kept informed about the issues of out-of-school time.

The National Institute on Out-of-School Time (NIOST) and Technology

In June 1994, staff at NIOST set in motion several technology activities to build a structure that would support the three MOST cities as they worked to implement their technology goals. A part-time technology specialist was hired to assess the needs of the MOST Initiative. The results of the internal needs assessment found that at NIOST, and in the cities, there existed:

- a severe shortage of hardware: the computers and modems needed updating, and the staff needed to be connected to the Internet;
- limited technology expertise: many staff were uncomfortable with computers and had little training.

During the planning year, the technology specialist at NIOST explored currently existing computer networks, hardware and software options, distance learning techniques, and emerging trends in the information technology field. Recommendations, specifications, and telephone support were shared with the cities. Each city used this information as they developed the sections of their action plan, which discussed goals for the uses of technology. The cities were required to meet basic communication standards, including:

- network hook-up and basic Internet training for the site coordinator in each MOST city,
- e-mail correspondence between NIOST site liaisons and city coordinators, and
- frequent review of appropriate electronic bulletin board(s).

Suggestions for additional city-specific uses of technology included the following items:

- training for collaborators and program directors through satellite and cable conferences;
- local conference sessions on the uses of advanced technology;
- e-mail communication with families, schools, colleges, funders, regulators, and policy makers;
- periodic updates of needs assessment and supply survey;
- computer training/laboratories in a school-age degree or certificate program; and
- computer assisted in-service training.

By May 1996, the technology specialist reported that at NIOST:

- computers had been converted to high-speed networking, allowing easier logins and the use of sophisticated Web browsers (Netscape);
- valuable information was being provided to the field via the NIOST Web site;
- the staff at NIOST had increased their computer expertise, now relying on e-mail, listservs, and bulletin boards for communication internally with MOST collaborators and with the school-age care field;
- conference calls among all three cities in which technology issues were discussed had facilitated cross-site communication while increasing people's knowledge of technological options;
- MOST-L (a mailserv) was developed specifically for cross-city communication allowing members of the MOST Initiative to send messages to the list, which would then distribute them to all of the people subscribed;
- NIOST frequently posts information on HandsNet, which links over 5,000 public interest and human service organizations across the nation; and
- NIOST and ERIC's establishment of SAC-L provides a national discussion list through which the MOST cities, other organizations, and SAC practitioners can pose questions, receive feedback, and share information across the country.

When the part-time technology specialist left NIOST, it soon became apparent that without a staff person dedicated to advancing technology, these goals lost their priority status. There was no one person to champion the need to move forward. As a result, the Web site stagnated, and other activities identified by the senior technology specialist remain unaddressed.

During the summer of 1997, NIOST did a much-needed revision of their Web page by developing a structure that is increasingly user friendly and that allows more information to be posted.

SAC-L has grown to over 200 members nationally, and feedback from list subscribers about content has been positive. Recently, one person started her request to list members as follows: "I appreciate so much of the information shared here. I feel like I've made friends and colleagues although most of you I have never met face-to-face." Information exchanged on SAC-L has included public policy and funding issues, staff compensation and retention, homework's place in an after-school program, transportation strategies, and program administrative issues. SAC-L has become a place for practitioners to continue conversations started at state and national conferences. NIOST works to build public awareness about SAC-L by including flyers in all information packets mailed to the public and has demonstrated its ease of use and value at workshops and other training sessions.

There are, however, technology goals that were recommended by the technology specialist that have not yet been realized by NIOST, such as:

- developing and posting an online publications order form,
- setting-up a chat line for SAC professionals to "talk" live via the computer, and
- coordinating an online database of NIOST's extensive library of printed materials on topics related to the issue of out-of-school time.

The focus of the National Institute on Out-of-School Time has been to build the technological infrastructure for the field of school-age care on the national level and to develop collaborators' skills and use of technology within the three MOST cities. Through reviewing the experiences of each city, it becomes apparent that several factors directly affect the ability of a city to reach its goals for using technology as a means of collaboration and a tool for disseminating information. The two primary factors to success seem to be (1) the help and expertise of a technology specialist and (2) the levels of computer access and literacy within both the collaborating organizations and the broader community. While the national goals of the MOST Initiative are the same for all three cities, the focus and progress in each city reflect their target population, priorities, and local collaborators, combined with community assets and barriers.

Boston MOST

Community Profile

Among Boston's 574,283 residents, only 9% are between the ages of 5 and 13. However, 38% of those attending Boston schools are members of families receiving welfare, and 64% qualify for free or reduced-price meals. The poorest communities in the city—Dorchester, Mattapan, and Roxbury—have the least access to technology through either home personal computers, public libraries, or schools. These communities have the largest numbers of school-age children and school-age programs in the city, as well as the highest unmet demand for school-age programming.

Primary Lesson

Boston MOST is now in its third year of implementation and is beginning to work to increase the use of technology to improve communication within their community collaboration and to disseminate information to parents, children, and providers in Boston. Any organization that attempts to address problems through community building and collaboration must understand both its own strengths and resources in the context of the abilities, needs, and assets of the community in which its members work. During the first 2 years, community stakeholders saw improvements in the quantity and quality of school-age care as much higher priorities than advancing technological resources. As a result, Boston MOST did not believe it appropriate to put an expensive and time-intensive item such as technology at the top of their agenda.

Accomplishments

From the beginning, Boston MOST worked to increase the use of technology by initiating an internal upgrade of equipment and development of staff skills, allowing for the use of e-mail to communicate with local collaborators, the other MOST cities, and NIOST. Because technological advancements were not one of their priorities, they did not use funding to hire a technology specialist.

Boston MOST has expended a lot of time and energy pursuing potential collaborations. Staff explored possible technology partnerships with boston.com (the electronic publishing arm of the *Boston Globe*) and the Boston Public Library. Together with a long list of community partners, NIOST, and the other two MOST cities, they applied for a Telecommunications and Information

Infrastructure Assistance Program (TIIAP) grant, which they were not awarded. Finding school-age information on the Web did not seem to be high on the list of priorities for either low- or moderate-income parents, or for resource-strapped service providers. The concrete needs for increased program availability, financing, and quality improvements took precedence over the expansion of a medium that not all of the community collaborators had agreed was worth the investment.

By the end of their second year as a MOST city, Boston staff shifted their ideas about technology. Their knowledge of computer systems and capabilities had improved, as had the knowledge of their community collaborators. Computers were increasingly accessible at public libraries and schools—to parents, children, and providers. Providers at directors' meetings began to express interest in having information available electronically. It was at this point in year 3 that Boston MOST began posing strategic questions such as, "How can we use technology to support our primary objectives around supply, quality, access, and organizational development?" Community stakeholders now view technology as a valuable tool that can facilitate the improvement of services to children.

Goals for Year 3

The Boston MOST staff is attending presentations and demonstrations by community organizations that work with nonprofit organizations to increase the use of technology in affordable ways. For example, one company has software available to upgrade the older, donated equipment that nonprofit organizations many times struggle to use effectively. An AmeriCorps member will provide part-time assistance to Boston MOST staff as they work to build a system of communication and information sharing. They hope that this AmeriCorps member will take on the roles of researcher, explorer, host, cheerleader, matchmaker, advocate, expert, and broker to support the broader use of technology by many more community members.

To assess the technological needs and interests of the community, Boston MOST has distributed a survey to program providers in order to acquire accurate information about their current technology capabilities, program interests, and financial abilities to acquire and maintain hardware. Boston MOST will use this information when they develop plans to distribute grants to local SAC projects. They may decide to require that programs, as part of the grant terms, increase the use of technology and the computer literacy of their staff.

Boston MOST also hopes to expand their use of technology by collaborating with other organizations interested in advancing this project. For years, they have had a printed directory of service providers within the school-age care field. One possibility is partnering with Inner City Access, which has an outline of a Web site on the Internet but no content. Boston MOST is offering the information from its printed directory of before- and after-school programs for posting on the Web page (Parents United for Child Care, 1997).

Chicago MOST

Community Profile

According to the 1990 census, Chicago had a population of 2,783,726. Of these residents, 40% were African-American, 38% Caucasian, 20% Latino, and 3% Asian. One-fifth of all households reported annual incomes of less than $10,000. Of all Chicago children between the ages of 5 and 11, 29% lived in households whose incomes were below the poverty level. Only 28% of households in Chicago have personal computers. Of those households with computers, 14% have modems, which are necessary for Internet access. A 1997 survey of the 472 member organizations of Chicago MOST, Chicago Youth Agency Partnership, and Children and Youth 2000 found that 64% of the 94 organizations responding have computers that are "Internet compatible," and 14% of the respondents have Web sites. The survey found that currently only 21% of the organizations responding helped provide children, youth, and parents with access to computers. Interviews with public agencies such as the Chicago Park District, Chicago Housing Authority/HUD, Chicago public libraries, and the Chicago Police Department were encouraging. During the next few years, these public agencies will provide increasing Internet access to the public.

Primary Lesson

Chicago MOST's work on technology reinforces central components of the theory behind the MOST model. First, as was shown in Boston, community-based organizations must modify their goals in response to the skills, needs, and commitments of the community. In addition, Chicago MOST's work on technology strongly supports the belief that the

collaboration of community organizations substantially improves the quality of services provided. When these two components connect, a model develops in which progress is continuously evaluated and expanded based on the increased knowledge and resources that are pulled together through collaboration.

Accomplishments

The goal of Chicago MOST was to build the technology infrastructure from both the program level and the community level simultaneously. Chicago MOST surveyed local programs about their current computer software and hardware; their interest and ability to provide computer access to parents, kids, and community members; and their financial ability to participate in a technology advancement project. Based on the responses to these questionnaires, 29 computers were awarded to programs.

After giving serious attention to both the hopes and fears of staff, programs, and community leaders, Chicago MOST was able to enter into exploratory discussions with staff from two large youth-oriented collaboratives that shared an interest in expanding the use of technology. After a 6-month investigative phase funded by the Chicago Community Trust, Chicago MOST collaborated with the Chicago Youth Agency Partnership and Children and Youth 2000 to develop a database (KINFO—information for kids and their kin) designed to address the information needs of Chicago based on available resources. These collaborative partners are currently seeking funding (including a TIIAP grant) to implement their design (Chicago Youth Agency Partnership et al., 1997).

Chicago MOST and their collaborators have developed a database that not only provides access to information relevant to the school-age care field but also links youth, their parents, and providers to resources on all aspects of out-of-school time such as jobs, continuing education options, mental and physical health, politics, and emergency service providers. KINFO will contain information from 446 Chicago-based organizations including centers for children and youth, universities and colleges, health care providers, advocacy organizations, religious organizations, corporations, and government agencies. In addition to providing local information about Chicago, KINFO will offer links to regional and national databases relevant to children and youth. KINFO demonstrates the type of collaboration and matching funding resources needed for sustainability of the MOST Initiative.

It is anticipated that this online database will receive widespread direct use by parents, youth, and professionals as access to computers increases in public schools, public libraries (plans call for all Chicago libraries to be online by the end of 1997), park district programs, and homes. Other locations for access are also being explored, such as day care centers, corporations, and building lobby directories.

Goals for Year 3

The Chicago MOST Web site has received little maintenance since it was created in 1995. Currently, the staff is working with Metro Chicago Information Center to enhance their Web site design, provide quality control of content, and offer training on updating site information. As soon as KINFO is operational, they will establish a link from the Chicago MOST Web site to the KINFO database.

Once adequate funding is secured for KINFO, their 2-year implementation phase will begin. Tasks include developing an infrastructure, gathering site content, creating and finalizing the design, piloting the site in two neighborhoods, advocating for increased public and private access to the Internet, identifying and cultivating stakeholders and developing funding streams, evaluating the pilot start-up, launching and marketing KINFO citywide, and, finally, maintaining the system by continuing to gather and create content and identify additional stakeholders and funders.

Barriers

While use of technology is expanding, several challenges remain in building a technology social infrastructure for the 77 neighborhoods of Chicago. Many out-of-school time programs do not have resources for technology. Some people see technology as a middle-class solution that will not serve the needs of their communities.

The accuracy and breadth of the database is contingent on the active support and participation of the multiple community organizations that have acted as resource or referral agencies. Some agencies are hesitant to collaborate with the creation of KINFO. There is a concern that the database will be competing with them in their role as information provider. However, KINFO can enhance the referrals these agencies provide to parents and make their services more valuable.

Seattle MOST

Community Profile

Seattle, with a population of 516,000, has over 12% of its residents living in poverty. The poverty rate among children and youth ages 6–17 is almost 16%. Less than 50% of all Seattle public school children have access to computers. Of those who have no access, nearly all come from low-income families. Providers of care to school-age children also have a high degree of computer illiteracy.

Primary Lesson

Seattle MOST hired a part-time technical specialist to research, promote, and coordinate their technology improvement efforts. The technology specialist also works part-time with SafeFutures, an initiative devoted to helping at-risk youth. His computer skills, combined with his experience providing technical support to community-based organizations, generated essential leadership and support that allowed Seattle MOST's technology plans to become reality.

Seattle MOST's initial action plan had a well-thought-out technology component. The main goal was to help parents and youth find and choose out-of-school programs and activities by developing an online database. Their agenda was thorough and specific to the needs of the city, including plans to work with language or cultural specific organizations to determine the most-effective way to gather and disseminate information and time to research computer networks and telephone "info line" services. The action plan that Seattle developed identified not only the primary information that the database would contain but also the target audiences of the database, the organization responsible for its research and development, possible collaborators within the community, their hopes and expectations around outcomes, and the estimated cost.

Accomplishments

Seattle now maintains up-to-date information on over 300 programs with over 11,000 slots and promotes the database through community events, the news media, and flyers. The database is available free of charge at 88 community access points throughout Seattle. Locations include all Seattle public libraries, Center for Career Alternatives, El Centro de la Raza, Operational Emergency Center, and numerous family, youth, and ethnic centers. During 1996, there were over 2,000 visits to the database and well over 10,000 visits to all of Seattle MOST's Web sites and documents. In addition, they sought and received a $35,700 in-kind cash donation towards large-scale publication of free *Neighborhood Guides to Activities for School-Age Children and Youth in Seattle* (based on the database), which have been printed and distributed throughout Seattle (Klein, 1997). Because of their accessibility, the database and Web sites have been important promotional tools for generating public awareness about the need for school-age activities.

To build capacity, Seattle MOST (along with NIOST and the other two MOST cities) sought funding from TIIAP in 1996, which they did not receive. But Seattle MOST recognized that increasing the computer access and skills of parents, children, and providers requires a collaboration of resources and information. They developed partnerships with Sound Connections—a project that gives personal computer hardware, Internet software and access, and training to nonprofit groups; with SafeFutures—a community effort to improve services for at-risk children, which has a human services database component that has complemented the efforts of Seattle MOST; and with Child Care Resources, who have a database of licensed child care providers.

The Seattle MOST "Find and Choose" Database has yielded some unexpected benefits. It has been used by support center staff to print customized lists of providers, by school-age care workers looking for places to work, and by providers looking for curriculum ideas. It has also provided preliminary statistics on slot availability, center capacity, and diversity within the school-age care system. Some secondary accomplishments include the online publication of a *Parent Resource Directory*, the *Young People's Pages* with youth views on out-of-school time, the *Youth Yellow Pages* (a resource guide by and for young people), a resource list for local school-age care providers, home pages designed for six school-age care programs, and the creation of an online database of licensed child care centers for Child Care Resources, the child care resource and referral agency that serves Seattle.

Goals for Year 3

The next step for Seattle MOST will be to make information more widely available to lower-income

families and ethnic minority communities through (1) the production and distribution of tens of thousands of printed *Neighborhood Guides* and (2) efforts to increase access to computers.

Today, all Seattle public libraries and public schools have some Internet access. Computer labs are sprouting up at many organizations and in low-income housing units. The Sound Connections project is pursuing funding for their well-developed plan to give 140 human service agencies Internet and e-mail access. SafeFutures staff will also help address this issue by assisting key agencies in gaining access to e-mail and the Internet.

The *SafeFutures Report on Electronic Access to Family Resource Information* (Klein, 1996) describes the pros and cons of the several community databases in Seattle. In this paper, Phil A. Klein, the technology specialist for Seattle MOST, discusses the issues that arose during the process of developing these databases and how they were resolved. He gives particular attention to issues of collaboration, resource maximization, and the integration of multiple information sources. This paper provides an in-depth look at one city's approach to technological developments.

Barriers

The factors impeding implementation of the database in Seattle included difficulty spreading the word through institutions such as the schools, a lack of pre-existing public awareness and demand for school-age activity information, and the limited access of both parents and providers to computers, combined with computer illiteracy. Patience and community networking helped overcome the first barriers. Wider distribution of information in print format represents an intermediate solution for sharing information until broader community efforts can increase computer literacy by improving the availability of computers and training.

Collaboration and Information Sharing as Only Two Steps among Many

The overall goal of the MOST Initiative is to improve the quantity and quality of opportunities that low-income children in the three cities have during their out-of-school time. Technology can enhance their lives by improving communication among community members, including policy makers and local funders, concerned with children's out-of-school time and by providing better access to comprehensive information about the availability of high-quality programs in their community. NIOST knows from the SAC-L electronic discussion list, and from a review of national technology initiatives (see Appendix A), that a growing number of individuals and organizations concerned with out-of-school time are on the Internet. Expanding this base both nationally and locally will enhance the work of the MOST Initiative and increase the likelihood that others have the information they need to support out-of-school time in their communities.

The primary difficulty with an Internet-based resource is that many potential users still lack access to, and knowledge of, networked computers. These deficiencies are due largely to the cost of purchasing and maintaining computers. The MOST Initiative recognizes the extent that technology issues disproportionately affect low-income families who critically need access to resources and information to help keep their children safe and occupied in fruitful ways during their out-of-school time. Vast inequity exists between high- and low-income families with respect to computer access (U.S. Dept. of Commerce, 1995). *Advanced Telecommunications in U.S. Public Schools, K–12* (U.S. Dept. of Education, 1995) showed that only 21% of schools with large proportions of students from poor families have access to the Internet, compared with 62% of schools with relatively few poor students. Two-thirds of families who are wealthy have personal computers compared to only 42% of families with incomes under $30,000. This discrepancy contributes to further economic inequity because low-income and minority individuals are not able to develop the technical skills that are increasingly important prerequisites for succeeding in today's workforce. Unfortunately, school-age care providers are often faced with the same monetary restrictions as the low-income families that they serve.

Access to technology can help to overcome the isolation built into the school-age care profession by creating a "virtual community" for providers who seldom have the opportunity to network in person. Information sharing via the Internet can not only facilitate professional development but can also help staff provide resources and suggestions to families, children, and youth. Most importantly, all children need to have access to computers so they can develop the skills that they will need to successfully participate in the work force of the 21st century.

Recommendations Based on the Experiences of MOST

From their own experiences and those in Boston, Chicago, and Seattle, NIOST has developed a few tips and suggestions to assist other cities and organizations as they consider using technology to improve their community's access to information about the issue of out-of-school time. These recommendations revolve around five central themes: leadership, collaboration, content, technological literacy, and technology infrastructure.

Leadership

The collaboration needs to involve a technology-savvy person who can research, develop, and sustain advances in the use of technology within both the specific community and the SAC field. This technology specialist will need to work with all the partners on many levels and fronts simultaneously in order to build a compatible vision and a realistic plan of action.

Recommendations to address the issue of leadership include the following:

- Community initiatives need to remain open and receptive to the possibilities technology can offer. Including a technology component in an initial plan will ensure that technology becomes a supporting strategy for the entire agenda.
- Hire a community technology coordinator who will convene a task force to conduct a needs assessment, develop an action plan, seek out collaborating partners, and apply for the funding necessary to implement improvements.

Collaboration

Increasing the use of technology requires substantial needs assessment, planning, financial backing, implementation, and ongoing support. The percentage of agencies and organizations that agree to post information on the Web, and encourage their staff and members to get training, directly influences the extent that technology will improve communication and information sharing.

Recommendations to address the issue of collaboration include the following:

- Build partnerships in order to increase resources. For example, many after-school programs are located in school buildings. As schools and after-school programs develop technology resources and capacities, both groups can expand curriculums to include computer-supported activities. They can also work together to increase and improve the sharing of information relevant to children's lives via the Internet.
- Collaborate with other city, state, and national technology initiatives. Not only will the goals of the technology project be advanced, but the development of partnerships among these organizations could become a building block for successful collaborations aimed at addressing many other issues faced by school-age children and their families.
- Look closely at whom you are trying to reach via the Internet. Build relationships with agencies outside the school-age field whose staff serve families and children in need of information on out-of-school time.
- National organizations need to continue to support and advise other national and local organizations in their use of technology to move high-quality information online. For example, staff from the MOST cities and NIOST are members of a National School-Age Care Alliance (NSACA) committee to advise on the design of a national technology network to support NSACA membership and the national accreditation system.

Content

The Internet is only as useful as the information that it contains. Agencies must work to post and update information, using Web site and database designs that are user friendly.

Recommendations to address the issue of content include the following:

- To address the gap in the availability of information related to school-age care, national organizations such as NIOST and NSACA need to continue to seek funding to support dissemination of high-quality information about the issue of out-of-school time and to spotlight "best practices."
- On a city level, work closely with the local child care resource and referral agency. An Internet self-accessed database is not a substitute for child care resource and referral information, and it is certainly not the same as a detailed

conversation one-to-one with a parent counselor. An Internet database may in fact increase telephone calls to the child care resource and referral agency for additional information about school-age care.

- Develop program-training materials that school-age care professionals and family day care providers can easily access through the Internet or via other technology such as distance learning.
- Build in feedback mechanisms to ensure that electronically available resources meet community needs.
- Establish guidelines to ensure high-quality content of electronic sites and monitor links to other sites.
- Promote subscriptions to local and national listservs and discussion groups (for example, SAC-L), which help create a "virtual community of practitioners."

Technological Literacy

The ability to use computers and other technology to improve learning, productivity, and performance is becoming a skill as fundamental to a person's ability to obtain a good job as traditional skills like reading, writing, and arithmetic. Technological literacy is a recurring theme of President Clinton's education plan: Right up there with every 8-year-old being able to read is the President's goal that "every 12-year-old must be able to log onto the Internet" ("A New Nonpartisan Commitment," 1997).

Recommendations to address the issue of technological literacy include the following:

- Encourage program staff, families, children, and youth to build computer literacy. Many libraries, adult education, and community centers can provide training and resources. More and more school-age and youth conferences offer workshops on using the Internet.
- Be sensitive to individual differences that affect a person's relationship to technology, especially gender, age, and cultural differences.
- Build into Requests for Proposals (RFPs) a provision that requires grantees to increase their internal uses of technology and disseminate project results and learnings via the Internet.
- Promote the use of the Internet. Include e-mail and Web site addresses on all printed materials: business cards, flyers, printed directories, FAX sheets, and stationery.
- Encourage increased program staff literacy by promoting the idea that high-quality out-of-school programs address the information skills that children will needed to function in the workplace and community of the 21st century.

Technology Infrastructure

Hardware, compatible software, access locations, and a systems management plan need to be in place for individuals and organizations to use technology effectively and efficiently.

Recommendations to address the issue of technology infrastructure include the following:

- Make information resources easily accessible to the whole community. Seek out schools, libraries, and community centers as access points and as collaborators in providing information, funding, and technical skills. For example, one partner may have the capability to establish a Web site, while others can provide content.
- Encourage staff training and technical assistance to ensure that resources are fully used and adequately maintained.
- Sell the cost benefits of technology to funders and end users; for example: e-mail can cost less than a telephone call, can avoid telephone tag and time-zone differences, and can distribute information quickly to a wide range of people.
- Use student interns, local service learning volunteers, or AmeriCorps members to input and maintain databases, to update Web sites, and to support program staff.

Closing Thoughts

If technology is integrated into the planning process, it can prove to be a powerful strategy in supporting the overarching goals of a project focused on improving the quantity and quality of out-of-school programming for low-income children and families in urban communities. It is important to remember that technology is not an isolated component of building a system of out-of-school care. Rather, technology needs to be woven into all aspects of the project. Not only can technology facilitate the dissemination of printed material, it can

also contribute to many nontechnical advances of the project such as building collaborations, attracting media attention to the issue, and supporting professional development efforts. The MOST Initiative has only begun to provide a glimpse of the possibilities that technology can play in the lives of children, families, staff, and communities.

Acknowledgments

We would like to thank the technology consultants from the MOST cities for providing us with detailed information and valuable feedback: Leah Baylon, Boston MOST/BSACCP; Greg Graham, Chicago MOST; and Phil Klein, Seattle MOST. We thank the DeWitt Wallace–Reader's Digest Fund for its continued support of the MOST Initiative.

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APPENDIX A

Technology Initiatives Addressing the Issue of Out-of-School Time

1. National School-Age Care Alliance (NSACA)

The North Carolina School-Age Care Coalition is leading the nation in the first pilot of a statewide system for school-age care accreditation. The system will be based on the National Improvement and Accreditation System (NIAS), developed by the National School-Age Care Alliance (NSACA) and the National Institute on Out-of-School Time (NIOST) (formerly the School-Age Child Care Project) at Wellesley College. This pilot project is funded by a grant from the American Business Collaboration for Quality Dependent Care.

In addition to promoting community awareness about accreditation, the project will recruit and train endorsers and ASQ Advisors and provide First Steps Training for programs. (ASQ is a self-study

process: *Advancing School-Age Child Care Quality.*) The North Carolina School-Age Care Coalition will also have a database that can be used to track inquiries about accreditation, responses to individual inquiries, and dissemination of materials. Through Internet access and a home page, school-age programs can review information about the accreditation process, standards, and strategies for program development. The home page will include information of interest to parents, potential funders, and the public at large. In addition to accreditation information via computer, anyone in North Carolina will also be able to obtain accreditation information through a toll-free telephone number. *Contact: Linda Sisson, NSACA, 1137 Washington Street, Boston, MA 02124; tel.: 617-298-5012; e-mail: staff@nsaca.org; Web: www.nsaca.org*

2. The Early Childhood & School-Age Forum in the Children, Youth & Families area on HandsNet.

Founded in 1987, HandsNet links some 5,000 public interest and human service organizations across the United States. Network members include national clearinghouses and research centers, community-based service providers, foundations, government agencies, public policy advocates, legal services programs, and grassroots coalitions.

From the NIOST home page, you can click on HandsNet and visit HandsNet on the Web. HandsNet on the Web offers daily news from HandsNet on CONNECT: information about services, forums, and members; the latest *Action Alerts;* and *The Weekly Digest,* a sample from the hundreds of policy, program, and resource articles posted each week by HandsNet members. The information on HandsNet on the Web is currently available at no charge. In the future, HandsNet plans to offer memberships to an expanded service on the Web.

For a membership fee, you can join HandsNet on CONNECT, a full-featured network environment with interactive forums for human service organization to exchange information and resources and to collaborate on a broad range of program and policy issues.

NIOST is the information provider for the School-Age Folder on the Early Childhood & School-Age Forum. *Contact: Lillian Coltin at the National Institute on Out-of-School Time, Center for Research on Women, Wellesley College, Wellesley, MA 02181; e-mail: lcoltin@wellesley.edu. Web site: http://www.handsnet.org/handsnet/*

3. ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE)

The ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE) is one of 16 ERIC clearinghouses funded by the Office of Educational Research and Improvement (OERI), U.S. Department of Education. ERIC clearinghouses identify and select documents and journal articles, and then prepare entries describing the documents and articles to be incorporated in the ERIC database, the world's most frequently used collection of information on education. Clearinghouses also publish digests, monographs, and other materials; answer questions; disseminate information on the Internet; and represent ERIC at conferences and workshops.

Located at the University of Illinois at Urbana-Champaign, ERIC/EECE contributes to the database in the areas of child development, the education and care of children from birth through early adolescence, the teaching of young children, and parenting and family life. The clearinghouse also operates several Internet-based discussion groups:

- CAMPUSCARE-L on campus children's centers
- ECENET-L on early childhood education
- ECPOLICY-L on early childhood policy issues
- MIDDLE-L on middle level education
- PARENTING-L on parenting issues
- PROJECTS-L on the Project Approach
- REGGIO-L on the Reggio Emilia (Italy) approach to early education
- SAC-L on school-age care

Web: http://ericeece.org

4. National Network for Child Care (NNCC)

The National Network for Child Care is part of the National Cooperative Extension System under the U.S. Department of Agriculture. Extension's National Network for Child Care is a group of professionals from across the country who have a vision of safe, caring, accessible child care for all children. NNCC is part of a larger Children, Youth, and Family Network consisting of National Networks for

Child Care, Science and Technology, Collaborations, Family Resiliency, and Health Decisions.

These networks are committed to improving the outcomes for limited resource families and at-risk children through collaborative efforts. The electronic and information service of these Networks is CYFERNET (Children, Youth, Family Education Resource Network). NNCC and CYFERNET can be reached at the following Web sites:

NNCC: http://www.exnet.iastate.edu/Pages/nncc/homepage.html

CYFERNET: http://www.cyfernet.org

5. National Child Care Information Center (NCCIC)

The National Child Care Information Center (NCCIC), an adjunct ERIC Clearinghouse for Child Care, has been established to complement, enhance, and promote child care linkages, and to serve as a mechanism for supporting high-quality, comprehensive services for children and families. NCCIC activities include the dissemination of child care information, outreach to Administration for Children and Families (ACF) grantees, and publication of the *Child Care Bulletin.*

Technology is vital to improving services for children and families. Through the Internet, listservs, and audio-conferences, for example, NCCIC connects administrators, organizations, and parents on a regular basis to discuss child care issues. *Web: http://nccic.org*

6. The Center for Career Development in Early Care and Education at Wheelock College

The Center for Career Development in Early Care and Education at Wheelock College is devoted to improving the quality of early care and education for children by promoting the definition of early care and education as a professional field and a field of study. Through their technical assistance, research, and information about conferences, they are able to bring about change that meets the needs of families, children, and the child care field.

The Center offers week-long intensive seminars for child care professionals that focus on practical, up-to-date information that can be put to use immediately. The Advanced Seminars in Child Care Administration (including one on school-age care) administered in partnership with the Wheelock College Graduate School, offer exceptional opportunities for networking and sharing with other practitioners, administrators, and policy makers. For information about the Advanced Seminars in Child Care Administration, contact: *Advanced Seminars in Child Care Administration, The Center for Career Development in Early Care and Education, Wheelock College, 200 The Riverway, Boston, MA 02215; tel.: 617-738-5200 ext. 279; fax: 617-738-0643. Web site: http://ericps.crc.uiuc.edu/ccdece/ccdece.html*

Links

ECCAREER-L
(ECCAREER-L@postoffice.cso.uiuc.edu)

ECCAREER-L is a private electronic discussion list available only to members of the National Career Development Network for the Early Childhood and School-Age fields. ECCAREER-L provides a forum for Network members to discuss the progress and challenges of their work on early childhood and school-age career development issues, to ask questions of one another, to share successes, and to solve problems.

7. Concordia College

The Concordia College in St. Paul, Minnesota, provides a number of services and information via their Web page. They offer information about their workshops, access to their library catalog of school-age care materials, descriptions of their publications, and links to many other home pages that discuss issues surrounding school-age child care. One of the many features that Concordia College offers is the Studying by Distance Learning (BA or MA program), which allows people to earn their degrees without attending traditional on-campus classes through Internet communication, discussion groups, and video and audio tapes. *Web: http://www.csp.edu/Dept_Pages/sac/sac.html*

8. National Organizations with Web Sites

More and more organizations involved with the issue of children's out-of-school time maintain Web sites. A few home pages to visit include:

Stand for Children (http://www.stand.org). The Stand for Children demonstration in Washington, DC, on June 1, 1996, inspired over 133 rallies across the country on the Stand for Children Day; and 256 towns, counties, cities, and states signed proclamations supporting Stand for Children. The

organization's Web site allows you to obtain practical information on ways to help improve the quality of children's lives in your community and to talk to others around the country who are taking a stand for children.

National Assembly of National Voluntary Health and Social Welfare Organizations (http://www.nassembly.org/html/about.html). This site coordinates several forums including the National Collaboration for Youth (NCY).

National Resource Center for Health and Safety in Child Care (http://nrc.uchsc.edu). This site has information on rules and regulations for child care centers in every state. You can also search for specific topics such as child–staff ratios in the "Frequently Asked Questions" section.

Search Institute (http://www.search-institute.org). The site builds on the Institute's national research and publications about children and adolescents. On this site, you will find information on developmental assets; information on Search Institute's Healthy Communities; information on various organizations and individuals committed to children, youth, and families; and back issues of the Institute's newsletters.

APPENDIX B

MOST Web Sites

The National Institute on Out-of-School Time (NIOST) Web Site
(http://www.wellesley.edu/WCW/CRW/SAC)

The NIOST home page has recently been updated. With new graphics, backgrounds, buttons, and a wealth of information, the pages are a comprehensive source for information on school-age care (SAC) and out-of-school time. The NIOST Web pages include descriptions of MOST (and links to the three cities as well as DeWitt Wallace–Reader's Digest Fund and Chapin Hall Center for Children), and other projects and initiatives at NIOST. Visitors to the NIOST pages can access a growing list of links and a library of online information including fact sheets on school-age children and welfare reform. A calendar of upcoming SAC events and announcements of news in the SAC field are also on the site.

Boston MOST Web Site
(http://www.wellesley.edu/WCW/CRW/SAC/most-bos.html)

The current Boston MOST home page includes a description of MOST-Boston, a link to the Boston Public Library, and phone numbers for Parents United for Child Care (PUCC).

Chicago MOST Web Site
(http://homepage.interaccess.com/~chgomost)

The Chicago MOST home page is currently "under construction" to update information and to correct links that do not work. There is a link to a 1991 book on *Parenting for an Age of Information: Preparing Your Daughter or Son for the Next Century* by Jamieson McKenzie. The Chicago MOST pages also include a mission statement, a directory of kid pages on the Internet (from March 96), and a directory of Chicago museums, libraries, and other resources (March 96). Their seminars and training page is under construction. There is a form to get on their mailing list and an e-mail link.

Seattle MOST Web Site
(http://www.pan.ci.seattle.wa.us/dhhs/most/index.html)

The Seattle MOST home page is beautiful and very extensive, yet up to date, user friendly, and well organized. It includes a short description of Seattle MOST, the searchable database of activities for children and youth in Seattle, and an extensive parent phone directory on many topics. There is information about MOST and Seattle MOST, links to child care resources, and a database of licensed child care centers in King County public schools. The page also has an online calendar of family events and activities; youth feedback on MOST (from summer, 1996); Seattle Youth Involvement Network; KidsWeb (World Wide Web digilibrary for school kids); SACC resources; and e-mail links to MOST-Seattle staff.

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Child Care Consumer Education on the Internet

Anne Goldstein ■

Abstract

Finding high-quality, affordable child care can be difficult and time-consuming. In the United States, government agencies, local communities, tribal governments, and national organizations are developing innovative child care consumer education strategies—including Internet-based efforts—to help parents with this task. Child care consumer education provides the information parents need to assess their needs, locate services, evaluate quality, and choose the best possible care for their children. Families looking for child care may benefit from the information offered through multimedia consumer education campaigns or through services offered by community child care resource and referral agencies. The Internet, when coupled with other modes of information dissemination, can also be an effective tool. Although the Internet provides an enormous amount of information, it also has obstacles and pitfalls around which a family may have to maneuver to find applicable information. Information providers need to study, evaluate, and improve consumer education initiatives to best meet the child care needs of all children and their families—both online and offline.

■

Introduction

One of the most important decisions that parents make is choosing child care for their children. However, for many families, finding child care can be a difficult process. It is estimated that "as many as one in four workers in the United States is currently dealing with child care problems and that 62 percent of working parents report major problems in finding quality child care" (National Association of Child Care Resource and Referral Agencies, 1996, p. 34). In 1995, more than 85% of children whose mothers worked full-time regularly received care from a nonparental caregiver. In addition, 75% of children whose mothers work part-time regularly receive care from providers other than their parents (West, Wright, & Hausken, 1995). Projections of labor force participation rates suggest that the need for child care will continue to grow as more women enter the workforce (Hernandez, 1995).

While introducing President Clinton at the October 23, 1997, White House Conference on Child Care, parent Kathryn Carliner spoke of her experience in searching for high-quality child care: "finding that level of high-quality child care today is an overwhelming challenge."

The *I Am Your Child* campaign, a national public awareness and engagement campaign, surveyed parents with children from birth to 3 to find out what their most pressing concerns were. One of the questions parents asked most often was "How can I find a trustworthy child care provider to take care of my child?"

Families are worried. They need high-quality, affordable child care so that they can succeed as parents and as workers, and they should not have to make do with inadequate choices. At the White House Conference, President Clinton made this point clear: *"No parent should ever have to choose between a decent wage and caring for a child."* Across the country, state agencies, tribal governments, local communities, and national organizations are developing effective and innovative child care consumer education strategies—including the Internet-based efforts—to help parents find the high-quality care they need.

Child Care Consumer Education Helps Families Succeed

Child care consumer education provides parents with the information they need to assess their needs, locate services, evaluate quality, and choose the best possible care for their children. Recognizing the value that child care consumer education can have for families, the Child Care and Development Block Grant, the federal child care subsidy program, requires states to collect and disseminate consumer education information to the families they serve and to the general public. Consumer education strategies are designed to help families address two key issues in child care: availability and quality of care.

Availability of Care

The availability of child care changes from community to community, from one part of a state to another. It also varies from one type of care to another. A study in 1995 found that in low-income neighborhoods, 88% of the available spaces in centers were filled (Ross, 1996), leaving families with few options. Availability may also be limited in some geographic regions, particularly in rural areas where there are fewer centers or family child care providers to help meet the need, and where the available care may not be near a family's home or workplace. Finding particular types of care, such as child care for infants, school-age children, and children with special needs, may pose exceptional problems. One study found that vacancies for infants and toddlers are especially limited: fewer than 10% of all vacancies could be filled by infants and toddlers (Kisker et al., 1991).

Availability of care is also affected by the times that parents need care. In 1990, 7.2 million mothers with almost 12 million children under 15 worked during nontraditional hours (U.S. Department of Labor, 1995). These families work split shifts, weekend hours, late evening hours, and early morning hours, and they need care for their children during these times. Yet, only 3% of centers offer evening care, making locating child care a real challenge for many working families (Hofferth, 1996). Consumer education campaigns can help families identify caregivers who meet their needs.

Quality of Care

Families need child care services that meet their needs—such as compatible program goals, convenient hours of operation, a location that is close to home or work, and affordability. They also require care that is safe and enjoyable, and that meets the developmental needs of their children. Child care consumer education provides families with information and tools so that they can make the best decision for their children's care.

> Parents may not recognize that an arrangement is likely to be of poor quality if they do not know which features of a child care setting or a provider's background are associated with quality. Lack of information may thus lead parents to use arrangements that are less reliable or of lower quality than they might find if they had better information. Lower-quality child care settings may adversely affect employment and children's development. (Ross, 1996, p. 1)

Cost, Quality and Child Outcomes in Child Care Centers, a 1995 study from the University of Colorado, found that there was "evidence of inadequate consumer knowledge" about the components of quality child care, and that this lack of knowledge "creates market imperfections and reduces incentive for some centers to provide good-quality care." Parents, as informed consumers, can make better choices and can increase the demand for high-quality services. Informed child care choices are essential. The goal of child care consumer education is to provide information to parents so that they may select high-quality services that meet the needs of their families. Through the process of selecting a child care setting, developing and sustaining a partnership with the care provider, observing the program and providing ongoing feedback, and participating in the development of program goals, parents play a critical role in assuring high-quality care for their children.

Child Care Consumer Education Strategies

To reach the broadest possible audience of families seeking and using child care, individualized consumer education and multimedia public awareness campaigns are utilized. All families currently using or looking for child care may benefit from the information offered through a multimedia consumer education campaign. However, this information is generally very broad, and families that are looking for child care services either for the first time or to replace existing care may prefer to access the one-on-one services offered by community child care resource and referral (CCR&R) agencies.

The delivery of child care consumer education by telephone or via face-to-face counseling is an approach that gives parents personalized attention and allows the consumer educator to tailor information to the client's needs (Mitchell, Cooperstein, & Larner, 1992). Direct consultation supports the child care decision-making efforts of parents either individually or in small parent groups.

Multimedia public awareness campaigns are designed to provide consumers, potential consumers, employers, and others in the community with general information on the importance of high-quality child care. These campaigns may involve the distribution of various printed materials, such as brochures, pamphlets, checklists to help parents identify high-quality care, fact sheets, and articles. Other community-wide strategies used to communicate the message include billboards and announcements on public transportation. Some campaigns have also included flyers containing general messages about the importance of high-quality care as an enclosure with utility bills and other mailings.

In addition to these print resources, longer consumer education pieces have been developed as videotapes that are played in hospital maternity centers, doctors' offices, health clinics, and social service agencies. Another method of sharing public awareness messages is through public service announcements (PSAs) on radio and television. Many communities have used local events such as health fairs and school functions as further opportunities to share child care consumer education information.

Many states and local communities have turned to electronic resources, including the Internet, to promote child care consumer education. The Internet is unique in that it can bring many features of a multimedia campaign together in one place for families to access.

One example of a nationwide multimedia consumer education campaign is Child Care Aware. Child Care Aware provides information on what high-quality child care is and helps families seek high-quality child care in their communities. Child Care Aware maintains a toll-free parent information line (800-424-2246) that helps parents locate resources in their community and provides information about high-quality care. Checklists and other materials are also available electronically and in print. In addition, with support from General Mills, information on what parents should look for when choosing child care was made available on boxes of Cheerios® cereal.

Another example of a national multimedia effort is the *I Am Your Child* campaign. The *I Am Your Child* campaign works to educate the public about the importance of the first 3 years of life. Their information dissemination efforts have included pamphlets for parents and community leaders, a nationwide prime-time television special, a video and CD-ROM for parents that include interviews with child development experts, and a World Wide Web site that includes general information on brain development, resources to help choose child care, links to other sites, and information about books, videos, and organizations that can provide additional materials. In conjunction with the Ad Council, the *I Am Your Child* campaign also utilized rotating advertising space on an Internet search engine to provide a link to their Web site.

Effective Child Care Consumer Education on the Internet

As the previous examples indicate, the Internet, especially when coupled with other modes of information dissemination, can be an effective mechanism for getting out the message that high-quality child care is important to children, families, and communities. Types of child care consumer education information online currently include checklists for use in evaluating child care programs, lists of providers, information on licensing regulations, articles, and current research.

Meeting the Information Needs of Families

Families come in all sizes, with varying needs and desires for their children's care. "Information is most powerful when presented from the consumer's point of view. For this reason, the language and thought process of the parent seeking child care (i.e., the consumer) should inform the design and delivery of consumer education" (Mitchell, Cooperstein, & Larner, 1992, p. 35). While the majority of the information available on the Internet is in English, sites such as the National Parent Information Network (NPIN) and the National Network for Child Care have led the way in providing materials for families in both Spanish and English. Unfortunately, most consumer education resources on the Internet do not as yet reflect the diversity of the families seeking

child care. Families who are familiar with search engines such as AltaVista may choose to utilize the online translation service that is provided.

Seeking and Finding Useful Information on the Internet

Child care information is abundant on the Internet. However, it may not be specifically targeted or organized to meet the needs of all families. A simple search on the words "child care" can yield over 200,000 related links. A search on "child care center" returns approximately 13,000 links. A further narrowing to search for "quality child care" brings the number of links down to 6,000. "Choosing child care" and "finding child care" net about 700 sites. Combining these ideas into a search for "choosing quality child care" generates about 180 links. While this is a more manageable number of sites to review, some families may be challenged to find the time or the resources to stay online for extended periods.

While child care information is abundant, finding community-specific information on the Internet may be difficult. Child care information is posted by a wide array of agencies, groups, and individuals, including state and local governments, colleges and universities, federal agencies, libraries, media, real estate agencies, state and local child care resource and referral agencies, national organizations, foundations, businesses, religious groups and organizations, child care centers and providers, and other community organizations.

The variety of organizations posting child care consumer education information creates several challenges to parents seeking information on the Internet. First, each organization posts the information in a different way with a different purpose in mind. Parents seeking electronic information may have to visit a large number of sites to get all the information they are seeking. In addition, parents may have no way to measure the validity or reliability of the information on a site. Some families may find that visiting several sites and developing or customizing their own guides and checklists is of value.

An example of how community agencies are providing families with convenient access to local information is the MOST Initiative (Making the Most of Out-of-School Time). One of the MOST communities, the Seattle MOST Initiative, used information from the local resource and referral agency to create an Internet-based comprehensive database of out-of-school time activities for children and youth. The database is available as free Windows software to agencies that serve families. Also available on their home page is information about the need for high-quality care for school-age children and links to child care and other community databases. A parallel home page is available in Spanish.

State and Community Resources on the Internet

States and communities are utilizing the Internet as one part of their strategy to promote informed child care choices. As with other online child care information, the type and amount of information available on state agency home pages varies widely. Several states have used the Internet to create useful resources for parents, with extensive information designed to meet the needs of families. For example, North Carolina has several pages that provide child care consumer education. These include a "What Parents Should Know about Child Care" home page with a directory of regulated child care providers, searchable by county, city, or zip code. The information available about the programs includes name, address, and phone number, type of license, hours of care, ages of children served, capacity, sanitation rating, and complaint history. Information is available on how to participate in the child care subsidy program, and there is also a listing of local child care resource and referral programs. Other resources include links to organizations with information on choosing child care.

The Web site of the Illinois Department of Children and Family Services includes extensive information on how to choose high-quality child care, including the full text of a brochure developed by the agency, information on applying for a child care subsidy, standards for centers and family child care homes, and links to local resource and referral agencies.

To provide targeted and effective comprehensive consumer education, the Internet is especially useful when used in tandem with services in the community. Resource and referral agencies are poised to utilize the Internet as an effective communication system for sharing information. The California Child Care Resource and Referral Network Web site provides information for parents such as "Who to call for free help in finding child care in California," "Tips for finding child care that works best for your family," information about the

Parent Voices Project, resource and referral child care data, and an index of the state-funded resource and referral agencies, such as Connections for Children. Connections for Children provides information on choosing child care, including "Selecciónando Cuidado de Niños," parent resources, community resources, a map of the service area, information on their community outreach programs, and how to contact their office for services.

Another example of community-based Internet consumer education is on the Initiatives for Children, Inc., Web site. Initiatives for Children is a resource and referral agency serving Houston and Southeast Texas. The home page includes information on their services and facts about child care. The site also has an online form available for their referral services. Requests for referrals can also be received by phone or fax.

Challenges of Internet-based Child Care Consumer Education Strategies

As previously stated, the sheer volume of child care consumer education information available on the Internet, combined with the nonspecific nature of the material, may require parents to invest a great deal of their time and resources in order to use the available information effectively. Community-specific information may be difficult to locate. "An effective *information architecture* guides information seekers to what they need" (Davenport, 1997). Many families may not be able to spend hours online seeking child care information or waiting for pages with large graphics to download. One option for alerting information seekers to potentially useful Web sites is to utilize online and offline marketing strategies. Announcements and flyers about consumer education should include Web addresses. Web sites can utilize marquee-style messages (one type of Java applet) that point users toward specific content areas of the site. Parents accessing Internet-based consumer education resources may experience frustrations caused by basic technological difficulties, such as busy signals, site transience, the disorganized nature of Internet search resources, and lack of controlled indexes (Urr, 1995). The issue of equity also needs to be addressed so that access to the Internet is available to families of all income levels, cultures, languages, and needs.

Conclusions

To be effective, child care consumer education on the Internet should be developed with parental input and user feedback. This consumer involvement is important to the design and format of the information delivery, as well as to the amount and type of information sought. In designing online strategies, consumer educators need to provide information that is:

- presented from the consumer's point of view, with literacy and language needs met;
- easy to find and well publicized to the target audiences;
- responsive to the needs of families looking for high-quality child care;
- continually updated; and
- one of many child care consumer education strategies used in a community.

The Internet is a communication and information tool that is accessed by millions of individuals each day. Information providers can benefit from sharing successes and working collaboratively to provide the most useful services to their constituencies.

One of the most positive aspects of electronic information dissemination is the ease with which information providers can link with other sites to enhance and broaden the resources available to parents. The fundamental task for consumer educators in providing child care consumer education on the Internet consists of collecting useful information, synthesizing it into a format that meets the needs of families, and presenting it in a timely and interesting way to the user.

The Internet provides the opportunity for families to access an enormous amount of useful information. It also has obstacles and pitfalls around which a family may have to maneuver in order to be successful in accessing child care information. As more information is made available through this electronic resource, we will need to continue to study, evaluate, and improve consumer education initiatives to best meet the child care needs of all children and their families—both online and offline.

Acknowledgments

This document was produced for informational purposes only and does not constitute an official endorsement of any resource, practice, or organization by the National Child Care Information Center, the Administration for Children and Families, or the U.S. Department of Health and Human Services.

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APPENDIX

Referenced Internet Sites and the National Child Care Information Center

Universal Resource Locators (URLs) for the World Wide Web sites referenced in the text are listed below:

***I Am Your Child* Campaign**
http://www.iamyourchild.org

Child Care Aware
http://www.naccrra.net/childcareaware/index.htm

National Parent Information Network (NPIN)
http://npin.org/respar/texts/chldcare/deleasu.html

National Network for Child Care
http://www.nncc.org/Choose.Quality.Care/spanish.choose.html

AltaVista
http://www.altavista.com

Seattle Making the Most of Out-Of-School Time (MOST) project
http://www.ci.seattle.wa.us/most/
http://www.ci.seattle.wa.us/most/espanol

North Carolina—What Parents Should Know about Child Care
http://www.dhr.state.nc.us/DHR/DCD/parents.htm

Illinois Department of Children and Family Services
http://www.state.il.us/dcfs/ccyrncon.htm

California Child Care Resource and Referral Network
http://www.rrnetwork.org

Connections for Children
http://www.cfc-ca.org

Initiatives for Children, Inc.
http://www.ini-children.org

Note that because of the ever-changing nature of the Internet, some addresses may not be available, and pages may have different resources than described.

National Child Care Information Center

The National Child Care Information Center (NCCIC) (800-616-2242; http://nccic.org) is an activity of the Child Care Bureau, Administration for Children and Families, U.S. Department of Health and Human Services. The primary role of the NCCIC is to complement, enhance, and promote child care linkages and to serve as a mechanism for supporting high-quality, comprehensive services for children and families through support to states, territories, tribes, policy makers, child care organizations, providers, parents, and the general public. ■

"But How Do We Use It?":
Discovering Hidden Barriers and Unanticipated Successes in Integrating Computers in a Preschool Curriculum

Melissa Groves, Michele Jarnigan, & Kendra Eller ■

Abstract

This paper describes the integration of computers into two preschool classrooms in the Child Development Laboratories at the University of Tennessee. Before the placement of the computers in fall 1996, conversations with teachers revealed concerns about how best to use the computers. As a result of these discussions, a plan for training and evaluation was developed that focused on how to increase teachers' familiarity and comfort with the technology. Shortly thereafter, hardware and software were purchased, and training was initiated. Observation of the classrooms in spring 1997 revealed unintended outcomes and effects. Even with an ongoing training plan for the computers in place, teachers struggled with the integration of the computers in the curriculum. On the positive side, the computer center became a significant parental interest and a place of frequent parent–teacher communication. Hence, as teachers became comfortable with the use of the computers into their classrooms, they also focused on how to use the technology as a tool for child observation and how to share that information with the children's families. A plan for integrating the computers into the whole curriculum still needs to be developed. The major challenge has been finding the time and resources to use computers effectively. Only continued planning, evaluation, and reevaluation will allow for the full and optimal use of computers in the early childhood setting.

■

Introduction

Meeting the challenge of technological literacy has been established as a critical goal for the American educational system (U.S. Department of Education, 1996). Yet, how does one begin the journey into technological literacy? How does a group with very little access to or experience with computers move from beginning use of technology to teaching with technology? And how does this transition happen in an early childhood education setting with the dual goals of teaching children and preparing teachers?

These questions were central when our program began to explore the possibilities of placing computers in our preschool classrooms in the Child Development Laboratories (CDL) at the University of Tennessee. This paper discusses the process of integrating computers into the preschool curriculum and describes our journey into technology use in an early childhood environment.

Taking the First Steps, or Why We Did This

The Department of Child and Family Studies at the University of Tennessee prepares undergraduate and graduate students for careers in programs for young children and their families. Within this program, teacher licensure in early childhood education (pre-kindergarten through grade 3) is granted upon successful completion of a fifth-year postbaccalaureate experience in the public schools. The department's CDL provides an integral component of the program as a primary placement site for practicum experiences. This full-day, year-round program serves children from infancy through age 5. The CDL affords opportunities for students in the program to gain proficiency in the abilities needed for successful careers while being trained within a model program.

Because the program prepares teachers, its curriculum must meet state and National Council

for Accreditation of Teacher Education (NCATE) standards for initial licensure. In 1996, the state mandated that several instructional technology standards be in place for initial teacher licensure no later than September 1, 1996. A key standard stated that teacher licensure candidates should have the "ability to integrate instructional technology into the classroom to facilitate interdisciplinary teaching and learning, supplement instructional strategies, design instructional materials, and enhance hands-on experiences and problem-solving" (see Appendix A for full guidelines). Thus, the stimulus for the integration of technology within the CDL program did not arise from within the program but from outside.

Moving Ahead, or Where We Went

Our first step into the use of technology was taken, not because we wanted to, but because we had to! As one of the most technologically literate people on the faculty, the first author was called upon to be a resource in the development of an action plan. Upon consulting departmental faculty and lab staff, it became clear that to meet the state-mandated competencies, computers needed to become a part of our preschool class curriculum. From this point, two separate yet interrelated steps were needed. First, hardware decisions and acquisitions had to be made. Second, a training plan was needed to help teachers use computers effectively in their classrooms. Identification and purchase of appropriate software were included within this step.

Step 1: Getting the Hardware

At the time (spring 1996), funding was available for an initial purchase of two computers. While the CDL has three preschool classrooms, a decision was made to place computers in the two classrooms serving the oldest children. This decision was based in part on the thinking that the younger children (3-year-olds) would move up to the classroom with the computer the following year. Additionally, these children did have an opportunity to use the computers at the beginning and ending of each day, because the children rotated classrooms.

Financial and university restrictions at that time limited the choices of hardware. After reviewing the options, we purchased two dual-platform Apple Macintoshes. Although our college operates primarily in a PC environment, we chose the Macintosh dual-platform computers because our students would be entering an environment that was primarily Apple/Macintosh based. While recent developments in technology are making the two environments more interchangeable, at the time, we felt that students needed experience with the Macintosh environment. The rationale for this purchase seemed sound, but in hindsight, we question this decision because the lack of technical support has become an enduring problem and challenge.

Step 2: Training and Software

Before the placement of the computers in the classrooms (fall 1996), conversations with classroom teachers revealed several concerns surrounding the use of computers. One set of questions focused on the downside of the use of computers by the children. Concerns expressed included fear that (1) the computer would replace other activities, (2) computer programs would stifle creativity and be strongly convergent, and (3) computers would increase social isolation. A second set of concerns voiced by staff was their own experience (or lack of experience) with computers. Teachers worried that their lack of knowledge might result in damage to the computers. Teachers were also insecure about their ability to help children "learn" how to use and care for the computer. Embedded within this concern were the issues surrounding the selection and use of appropriate software in the classroom.

A third set of concerns underlying computer use by children was not voiced as much by the classroom teachers but is perhaps the more critical (and continual) challenge of using computers in any classroom setting—that is, fully integrating computers into the curricula so that computers become more than an add-on.

These types of concern were not unusual for early childhood educators (Bredekamp & Rosegrant, 1994; Haugland & Wright, 1997; National Association for the Education of Young Children [NAEYC], 1996). However, because our program also prepares teachers, computer integration within the curriculum is critically important. As a result, a formal plan for training and evaluation was developed that focused on how to increase teachers' familiarity and comfort with the use of technology. This training plan was instituted in fall 1996 and included (1) the purchase of the NAEYC book *Young Children: Active Learners in a Technological Age* (Wright & Shade, 1994) for each

staff member using technology in his or her classroom, (2) an initial in-service training session provided by an outside early childhood educator who had successfully integrated technology into her teaching, and (3) ongoing observation and assessment of the CDL's process of integration.

As part of this process, we decided that inaugural software purchases would be those that had been recommended by other locally known early childhood professionals. Given our inexperience with software selection, we believed this type of recommendation was best for the program and that the software purchased would be of "high quality." These initial purchases of software included a utility program (KidsDesk) to protect the hard drive from child manipulation and six pieces of software that in general could be classified as more open ended.

The use of technology began slowly as teachers increased their familiarity with the operating system and software applications. Initially when the computers were placed in the classroom, there were several ongoing glitches that impeded full progress and satisfaction on the part of the teachers. Hard drive failures, insufficient memory, and a broken mouse were just some of the problems encountered in the first few months of integration in the classroom. The lack of consistent technical support for the Macintosh environment within our college continues to be a problem in getting solutions to even the simplest hardware difficulties. Another problem initially encountered was the temporary lack of printers due to a shortage of funds. While printers are not necessary for the operation of computers, the full and developmentally appropriate use of computers with young children is greatly aided by the ability to print. A final problem encountered was the popularity of the computer area as an activity area. Teachers struggled with the difficulty of monitoring and establishing a policy of "fair use." Use of a chart and timer was instituted by the teachers to ensure that all children who wanted an opportunity to use the computer had a chance to do so.

Initial Observations

During spring semester 1997, glitches had decreased so that the more formalized observation of the two classrooms began. These observations were independently conducted by the second and third authors of this paper. General conclusions from the observations were that despite initial concerns that children would be solitary figures at the computer, quite the opposite was the case. Children were often observed communicating and assisting each other at the computer. Another unanticipated effect was that the computer center became a significant parental interest and a place of frequent parent–teacher communication. Children would want to show their parents what they could do on the computer, and teachers would assist the children and comment on these activities to parents. Thus, the computer center has become one of the most social centers of the room.

Even with an ongoing training plan for the computers in place, teachers struggled with the integration of the computers in the curriculum. The observations in the spring semester found that use of the computer in group time had been limited. Additionally, the computer had not been used in conjunction with other activities. Finally, software was introduced by "trial and error." New software often just appeared without discussion with the children about how it could be used. Because of limited time and resources, teachers had little opportunity to review the software outside of the classroom to discover its maximum potential in the classroom. Additionally, a plan for changing out the software was missing. Unlike other classroom material, which is rotated in and out of the classroom setting, all software was likely to be continually available for the children's use.

The Future, or Where Do We Go

Based on the observations during the spring semester, the following recommendations can be made for integrating computers in the classroom. First, staff development training must be hands-on, ongoing, and developmentally appropriate. The scarcity of computers outside of the classroom limited teachers' access to the machines. Time also is key in the integration of computers. One in-service training session does not begin to address the need for experiential learning when it comes to computer technology. Teachers, like children, need time for processing and reflection.

We found the computer area to be quite social in terms of child-to-child or teacher-to-parent interaction. However, in general, teachers did not spend large amounts of time facilitating individual children's learning. Teachers often were only in the computer area to troubleshoot a problem, change software, or monitor children's time using the computer. A more direct acknowledgment of the teacher's role in facilitating the use of the computer in learning is an ongoing concern.

An unintended effect was that the computer center was one of significant parental interest and became a place of frequent parent–teacher communication. Hence, as teachers developed more comfort with the use of the computers in their classrooms, they needed to also focus on how to use the technology as a tool to share that information with the children's families.

The use of a timer is an ongoing concern and is under discussion within our program. Children were not able to adequately explore a program when time was limited. This problem may be alleviated somewhat with the recent acquisition of four additional computers. These new computers allow us to have two computers in each of our preschool classrooms. However, we need a mechanism that allows the children deeper exploration of the software programs. Additionally, a record-keeping or observational system whereby teachers can track children's experiences with the computers is needed.

A plan for integration of the computer into the whole curriculum needs to be developed. Some beginning steps would be for teachers to fully explore the possibilities of the software. Knowing all the different applications and aspects of software packages is necessary for effective integration into the classroom. From that point, teachers can develop extension activities that enhance the concepts introduced within a piece of software (see Appendix B for an example). Staff meetings can be used to brainstorm other uses for computers within the classroom. At the time of our introduction of the computers, lesson plans did not include a section for the use of the computers as a teaching/learning center. The current evaluation of undergraduate students during their student teaching in our program does not include recognition of their use of technology in lesson planning. All of these aspects are part of the program's ongoing plan for the integration of technology.

The major challenge for the program has been finding the time and resources to use computers effectively in the classroom. This challenge is not unique to early childhood settings but is the difficulty of technology inclusion across educational settings. The dispositions of curiosity and lifelong learning are essential for successful integration in any setting. Only continued planning, evaluation, and reevaluation will allow for the full and successful use of computers in the early childhood setting.

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APPENDIX A

Instructional Technology Standards for Teacher Licensure in the State of Tennessee

Instructional Technology (the following knowledge and skills are integrated into the entire teacher education preparation program and build upon the basic technology requirements and capacities specified in NCATE standards for approval of teacher education units):

A. Ability to integrate instructional technology into the classroom to facilitate interdisciplinary teaching and learning, supplement instructional strategies, design instruction materials, and enhance hands-on experiences and problem solving.

B. Ability to manage different learning strategies and develop higher level thinking skills using various instructional based technology tools; ability to select, use and integrate appropriate technology-based resources relative to specific grade level and content of subject(s) being taught.

C. Understanding of types, characteristics, sources, and use of quality instructional software and other technology-based learning resources.

D. Understanding of software purchasing agreements and software copyright laws and the need to plan for legal usage; understanding of virus protection of software and policies for acceptable use of the communication capabilities of computer technology.

E. Understanding of basic computer hardware configurations, terminology, peripheral connectivity, telecommunications, and networking technology and concepts.

F. Ability to perform basic operating system tasks, software functions, and minor troubleshooting on the most current and available operating systems and components of computer technology.

G. Ability to work with software program menus to open and close application programs; load and install programs; create and edit documents; create and use a database; create and use a spreadsheet; transfer data or information originated on one software package to another using computer technology; utilize a software presentation package to create presentations for use on a computer technology projection system.

H. Ability to use a modem for communication and access to the Internet with computer technology; knowledge of the uses of audio, video, and optical technology for capturing and incorporating information and data for computer technology.

Required for all candidates for initial teacher licensure no later than September 1, 1996.

Source: Tennessee State Department of Education. (1995). *Teacher Education Program Matrix.* Nashville, TN: Tennessee State Department of Education.

APPENDIX B

Some Examples of Teacher Ideas for Extension of Software Activities

Software: Millie's Math House

Explore and Discover Mode: The character remains in the picture frame.

- Experimentation
- No right or wrong answer
- Play as long as you like

Question and Answer Mode: Click the character out of the picture.

- The character will ask questions or make requests.
- Offers praise for correct responses.

Adult Options: Press Option-Apple-A

Sample Activity Rooms:

A. Little, Middle, Big

- Explores concept of size. Identifies, compares, and examines similarities, differences in sizes.
- Expands vocabulary of "size words."
  *Click the cat to mix up shoes. Click again if you want to sort them by size.

Extenders:

1. In group, play a riddle game (i.e., "I see something larger than a block and smaller than you!") Allow children to come up with as many answers as they can.
2. Using a flannel board, either in a group time or quiet corner, make flannel people with various size hats, shoes, mittens, etc. Talk about concepts of "too big" and "too small." Compare sizes; create silly characters.

B. What's My Number?

- Recognizing the numbers 0-10.
- Understanding the concepts of one-to-one correspondence.
- Exploring basic addition and subtraction.
- Recognizing and reading number sentences, written or spoken numbers and the qualities it represents.
  *Click Dorothy Duck to repeat the question.

Extenders:

1. Games: Use beans, marbles, along with egg cartons to sort and count objects.

C. Number Machine

- Children will see, hear, and recognize the numerals 0–30 and hear these counted.
- Concept that numerals represent quantity presented.
- Hear singular and plural forms of nouns.

Extenders:

1. Group or quiet area: Find numbers in environmental print or books.
2. Art: Cut and paste numerals to make a number or counting book.

D. Bing and Bong

- Create and complete patterns.
- Recognize that a pattern is made up of regularly repeated parts and that the parts make a "whole."

*Each picture makes its own sounds—record children's own sounds by clicking the microphone.

Extenders:

1. Group: Ask the children to identify patterns in the environment (e.g., windows, walls, fabrics, stripes, wood trim, etc.).
2. Group: Clap out names of children or characters (e.g., Jen-ni-fer).

E. Mouse House

- Matching, discriminating sizes and shapes.
- Identifying and labeling shapes, creating shapes.
- Discovering that shapes are the same, regardless of position or size.
- *Options—print; color designs; add bricks, scenery, and people.

Extenders:

1. For art, group, or the quiet corner: Cut out shapes or half shapes from fabric or flannel and let the children explore what they can create.
2. Cooking geometric pretzels

   1 pkg. dry yeast
   1 T. sugar
   1½ cups water
   1 t. salt
   4½ cups of flour

   Knead dough 5 minutes, add flour if necessary. Roll into "ropes," make shapes. Place on lightly greased cookie sheet. Brush lightly with water and sprinkle with salt. Bake 9 minutes at 475 degrees.
3. Art: Cut out flat sponges into shapes—sponge paint to create cities, structures, houses, etc. Display as murals.

Adapted from: *Millie's Math House User Guide.* (1992-1995). Redmond, WA: Edmark.

■

Making Connections:

Helping a School, Its Families, and the Community Adapt to Technological Change

Walid Elkhoury & Dana McDermott Murphy ■

Abstract

The Latin School, a private K–12 school in Chicago, is integrating technology into the school environment and teaching its ethical use. Recognizing that children and families need assistance in adjusting to current rapid technological change, the school developed a plan for parent education and support. Staff continue to get parents involved in the school's Math, Science, and Technology 2000 program to enhance their children's adaptation to the changing school learning environment. Parents are kept aware of the school's resources, including Internet access and a home page, and are informed about use policies. Concerns associated with the use of technology in school and home are also addressed. The school hopes to keep teachers, students, and families informed and actively engaged in the changes and challenges that will remain a normal part of everyone's lives in the years to come through ongoing school–home communications and activities, through the school-based Parent Education Initiative, and through the ongoing adult education program "Live and Learn." ■

Introduction

Who are we and what have we been doing?

For 3 years, the first author has actively developed ways to involve parents in the comprehensive math, science, and technology program he was recruited to implement at the Latin School, an independent K–12 school in Chicago. The second author is collaborating with him to support current parent involvement and interest in the project through the Latin School Parent Education Initiative. The necessary school climate for this endeavor, which is present at the Latin School, includes a commitment to lifelong learning; a carefully planned introduction for faculty, staff, students, and parents to the place of technology in education; a reaching out to the larger community to share the process and resources; and an ongoing effort to cultivate and sustain interest, involvement, and related competencies.

The Parent Education Initiative was begun in 1995 at Latin School to support parents as lifelong learners as they adapt to their changing children, families, and communities. We view technology as a prime opportunity for parent adaptation and growth.

Background: Call for a Change

Few would deny that children and families need assistance in adjusting to current rapid technological change. The National Association for the Education of Young Children (1996) suggests that teachers and parents need to examine the impact of technology on preschoolers and work together to promote appropriate uses of technology. We also know from research, as reported in the Carnegie Council (1995) document *Great Transitions,* that the essential requirements for healthy development for preadolescents and adolescents include "acquiring the technical and analytic capabilities to participate in a world-class economy" (p. 10). In addition, we know that parent involvement is vital to student academic success at this age (Comer, 1989; National PTA, 1997).

It is in that spirit that the Long Range Planning Committee of Latin School stated in their mission statement as early as February 1994 that academic

programming must "embrace technology to support the best possible academic program and the most flexible learning environment." The strategies for attaining this goal were to encourage technological awareness and skill development among students and faculty; to use technology to enhance curriculum, to challenge students, and to address their different learning styles; to create a multidisciplinary approach linking mathematics, science, and technology; and to create a culture of responsibility and ethical use of technology. Comer and Haynes (1991) add that "a parent program needs to be part of a comprehensive school change initiative and that the other key players in the school community, such as the central office, the principal, the teachers and other staff need to be oriented to the program" (cited in Haynes & Ben-Avie, 1996, p. 54). This was indeed the case for us at Latin School.

Our initial concern was how to get parents involved in our math/science/technology initiatives in order to enhance their child's adaptation to this changing school learning environment. Recommendations of the Carnegie report included preparing youth for the 21st century by creating "family resource centers that provide educational programs for parents, including computer literacy" (Carnegie Council, 1995, p. 55). Why do parents need to be involved? We know that change is often difficult. Comer (1989), in his own work in which parents were involved in a school change initiative, noted that "the children observed and identified with their parents as active learners and contributors to the school program, and they internalized the attitudes, values and ways of the school" (p. 26). Thus, by being involved in learning about technology, parents demonstrated to their children that learning is a lifelong process that is valued.

In a recent report of the National PTA (1997), educators were encouraged to provide varied communication opportunities for parents and schools including e-mail. We were also advised to provide technology workshops for parents and to institutionalize such workshops. Other suggestions include special events, such as health fairs, technology nights, or other learning opportunities, to inform parents and families. Since 1995, Latin School has been doing what the National PTA recommends.

Laying the Foundations

To support parent involvement, we first needed to inform parents by raising their awareness as to what resources we had and what we were doing (see Appendix A).

Latin was among one of the first schools in the nation to develop a home page and use it as part of the educational process. Some of Latin's student's work has been cited in the book *Kids Doing the Web*. Latin School was the first prekindergarten–12 school in Chicago to have direct access to the Internet with a T1 line connection and a 16-line modem pool for people to access outside of the school. It remains one of a handful of independent schools with this resource. The network supports 400 computers, 220 Power PCs, 60 Pentiums, and 50 printers. Latin has a computer on every faculty/staff desk, a printer in every office, at least one Power Mac in every faculty office, access to the Internet from virtually every room, digital cameras that allow you to download a picture to the computer for editing, QuickCam cameras that allow you to videoconference, and classrooms with multimedia stations, scanners, color printers, and video data projectors. Latin's library catalogs and Illinet (Illinois library catalogs online) will be available through the home page. Latin also has made a conscious effort to provide students with many discipline-specific cross-platform software programs such as Claris Works 5.0 (English and Spanish versions), Netscape, HyperStudio, Image Processing, Photoshop, and Eudora.

The school has a dial-in program for families and staff to access the school network as well as the Internet. The school provides faculty an interest-free loan of up to $3,000 to purchase a home computer with 2 years to repay the loan. In response to the exponential growth of technology and the challenges associated with that growth, the school has established an Information Systems Department in addition to its Academic Computing Department, with the latter overseeing plans for using technology to enhance instruction, curriculum, and assessment and to encourage professional development of faculty. We are confident of the infrastructure that has been built; however, no plan is complete without the proper support of the faculty entrusted with implementation of the program. Our faculty has responded enthusiastically to the use of technology in the classroom. We also have a technology committee that includes representatives from all divisions and disciplines. Our Internet policy is now included in the student handbook.

Next, we had to demonstrate what we were doing via school assemblies, during which we explained policy and what was available. We also needed to address concerns associated with the use of technology in school and home. We then sought to help parents understand what was being done through hands-on parent activities.

To involve parents, we held Technology Awareness Evenings for parents that included multimedia presentations. One presentation was geared to parents of lower school students, the other to parents of middle/upper school students. In 1995, the programs lasted about 90 minutes and included the following presentations (for the upper-level school parents):

- Overview: Panel Presentation
  - Internet—Threat or Opportunity?
  - Security
  - Filtering
  - Dialing into the School
  - The Latin Network
- Software Highlights
  - HyperStudio
  - HyperCard
  - NIH Image
  - Geometry Sketchpad
  - CDs (e.g., Adam's Essentials)
  - Adobe Photoshop
  - PageMill
- Examples of Faculty and Student Uses of Technology
  - Math, Science and Technology in the Middle School
  - HTML—AP Biology, AP Calculus
  - HyperStudio—Chemistry
  - Internet—South Africa assignment
  - Adobe—Visual Arts
  - CD-ROM—Foreign Language, Science
  - Home Pages—Faculty and Students
  - Library
- Future
- Upcoming Live and Learn Classes for hands-on experience
- Questions and Answers

The Technology Awareness Evening for parents of lower-school students was similarly structured but addressed concerns and materials appropriate to that age level.

After parents learned of our initiative via assemblies and awareness evenings, we offered a course as part of our already well-established continuing education program at Latin School, "Live and Learn." We had 128 parents take this introductory course the first time. Because of its popularity, we had to add additional courses. These 2-hour sessions included "Introduction to Internet E-Mail," "Netscape Basics," "How to Create Your Own Home Page for the World Wide Web," "Introduction to Multimedia," and "Introduction to Hyperstudio." We took the opportunity at these sessions to explain Internet user policy and ethical issues involved (see Appendix B) and to define frequently used terms, such as *bandwidth, Ethernet, e-mail,* and *telnet.* We also mailed all school parents a list of recommended materials for gift purchases for the holidays along with other informative handouts.

We developed workshops for teachers and staff each year before school began and then throughout the school year. We also hosted and will continue to host Technology in the Classroom conferences at the school for other teachers/schools with Latin faculty demonstrating what they do with technology in many different disciplines. Workshops included "Networking," "Evaluation of the Essay," "Image Processing in Science Teaching," "Electronic References," "Discovering Geometry with Your Computer," and "Using the Internet in the History Classroom."

Finally, we continue to work to sustain and cultivate an interest in our efforts by assigning projects for families, creating an atmosphere acceptable to change, and enhancing Web site services—for example, home pages, family passwords, ability to communicate with teachers and access grades/information, and activities and resources of the Parent Education Initiative.

Concluding Comments

Preparing for the Families, Technology, and Education conference provided us with an opportunity to reflect on all that has been accomplished at Latin School in the past 3 years. Implementing technology has been a process of adaptation for all involved. We do hope that we can network with others in the field to share our own experiences and learn from them to improve services to families. Our goal is to keep teachers, students, and their families informed and actively engaged in the changes and challenges that will remain a normal part of everyone's lives in the years to come.

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APPENDIX A

Sample Letter to Latin School Parents

January 16, 1996

Dear Friends,

As the area of information technology has grown in leaps and bounds, and as the School as expanded its computer resources, some of you may have found yourselves taking lessons in the new technology from your son or daughter. As part of our continuing efforts in the areas of technology and computer education, we are presenting two informative evenings for parents which are designed to help you fill in some of these gaps. They will provide you with a basic knowledge of the way your son or daughter is using technology each day at Latin, and introduce you to ways you can also make use of Latin's computer resources and network. Enclosed with this letter is a brief overview of the topics that will be covered during these evenings.

As a follow-up to these evenings, Live & Learn, Latin's adult education program, has organized a series of classes on technology, computers, and the Internet. The classes will take place in the last two weeks in February and will be taught by members of Latin's Computer and Science Departments. A complete list and description of these classes is included in the January/February issue of *Latin Today*, which you should receive shortly.

We hope many of you will take advantage of the parent evenings and the Live & Learn courses. It is our hope that through these efforts, you will gain a more complete understanding of the ways the School is fulfilling its Long Range Plan goal "to embrace technology to support the best possible academic program and the most flexible learning environment."

Sincerely,

Frank Hogan

APPENDIX B

Excerpts from Latin School's Computer Use Guidelines

Computers and Technology

All computer users have two basic rights—privacy and a fair share of resources. All students, faculty, and staff have the responsibility of using Latin computer systems in an efficient, ethical, and lawful manner. The ethical and legal guidelines put forth below derive directly from standards of common sense and common decency that apply to the use of any public resource within the school.

Rights and Responsibilities

- Computers and networks can provide access to resources on and off campus, as well as the ability to communicate with other users worldwide. Such open access is a privilege, and requires that individual users act responsibly. Users must respect the rights of other users, respect the integrity of the systems and related physical resources, and observe all relevant laws and school regulations.
- The user should select an obscure password and change it frequently to prevent unauthorized access to their private folder and/or restricted applications and data by other users. The user should also be aware of viruses and other destructive computer programs, and take steps to avoid becoming an unwitting victim or means of transmission.
- It is the responsibility of the individual to make backup files of the documents they create. There is no guarantee that items produced on an individual Mac and left in the local guest folder will be there the next day; all important files should be copied either to a diskette or to the individual's user folder. User folders on the student and faculty servers are backed up once weekly.
- System administrators may access user files as required to protect the integrity of computer systems. For example, system administrators may access or examine files or accounts that are suspected of unauthorized use or misuse, or that have been corrupted or damaged. Games, cartoon sounds, and icon collections found in student folders and guest folders will be deleted.

- Users are reminded that for their own protection, they should not discuss or give out specific personal information about themselves such as age, phone number, or address to strangers encountered in the course of online or e-mail exchanges.
- All existing laws (federal and state) and school regulations and policies apply, including not only those laws and regulations that are specific to computers and networks, but also those that may apply generally to personal conduct.
- Misuse of computing, networking, or information resources may result in the loss of computing privileges. Additionally, misuse can be prosecuted under applicable statutes. Users may be held accountable for their conduct under any applicable school policies or procedures. Complaints alleging misuse of Latin resources will be directed to those responsible for taking appropriate disciplinary action. Illegal reproduction of software protected by U.S. Copyright Law is subject to civil damages and criminal penalties including fines and imprisonment.

Examples of Misuse

Examples of misuse include, but are not limited to, the activities in the following list.

- Using a computer account that you are not authorized to use. Obtaining a password for a computer account or folder without the consent of the true owner.
- Using someone else's login or e-mail account which has inadvertently been left open.
- Using school resources to gain unauthorized access to any computer systems.
- Knowingly performing an act which will interfere with the normal operation of computers, terminals, peripherals, or networks including erasing applications, making modifications to system files, or interfering with the functioning of the server computers.
- Knowingly running or installing on any school computer, or giving to another user, an application intended to damage or to place excessive load on a computer system or network. This includes but is not limited to programs known as computer viruses, bombs, Trojan horses, and worms.
- Playing games during school hours; playing or programming the display of distracting sounds and/or visuals on lab computers.
- Attempting (with or without malicious intent) to circumvent data protection schemes or uncover security loopholes. This includes attempts to decrypt intentionally secured files.
- Violating terms of applicable software licensing agreements or copyright laws. Protected software is not to be copied into, from, or by any Latin facility or computer except by license.
- Deliberately wasting computing resources (i.e. exceeding the student folder storage quota or wasting pages on the laser printers in the library, computer labs, or elsewhere).
- Using electronic mail to harass others or sending unauthorized mailings to large numbers of students.
- Posting objectionable or slanderous messages on a public bulletin board.
- Masking the identity of an account, machine, software application, or icon.
- Posting, downloading, e-mailing, or depositing onto any school computer materials that violate existing laws or the school's codes of conduct (e.g., graphic material of an obscene nature).
- Academic dishonesty (plagiarism, cheating, intentional damage to or deletion of someone else's work).
- Attempting to monitor or tamper with another user's electronic communications, or reading, copying, changing, or deleting another user's files or software without the explicit agreement of the owner.

Enforcement

- Minor infractions of these policies, especially if they appear accidental (e.g., poorly chosen passwords, overloading the system, excessive disk space consumption, hundred page laser printouts, and so on) will result in a warning by e-mail or in-person discussion.
- Infractions such as sharing of passwords, harassment, or repeated minor infractions as described in, but not limited to, the policies stated above may result in the loss of computer lab access privileges.
- More serious violations, such as unauthorized use, attempts to steal passwords or data, unauthorized copying or use of licensed software, or repeated violations as described in the above paragraphs will be referred to the Dean of Students and/or the Upper School Principal for appropriate action.

Policy adapted from:

—*Berkeley Computing*, Volume 3, Number 1 (January-February 1993)

—Indiana University, *Computer User's Privileges and Responsibilities*, Spring, 1990

—University of California–Davis Computer Use Policy

—University of New Mexico Ethics Code and Policy for Computer Use, July, 1991

Internet

Latin students can use the Internet to assist their learning, provide data for research projects, and allow for collaborative learning. Teachers and students have access to electronic communication with users all over the world, immediate access to information only a few minutes old, pictures, movies, sounds, and text that can either be viewed or downloaded, public domain software and shareware of all types, and discussion groups on all kinds of topics.

Internet Guidelines

The Internet is now available to the Latin School community. All members will have access to the Internet provided they agree to follow these guidelines:

- Student users must have parental permission to use Latin's Internet access.
- Accessing Internet sites that contain pornography or obscenity is forbidden.
- Addresses, photographs, or personal information about students identified by name may not be sent over the Internet without parental permission.
- Any material or user contact with which the student is uncomfortable must be reported to a faculty member.
- Every user must accept responsibility to monitor and control all materials sent or received under his or her account.
- No member shall use the Internet to transmit any material in violation of any federal or state regulation. This includes, but is not limited to, copyrighted material and threatening or obscene material.
- Use for commercial activity or for advertisement is prohibited.
- No member shall access the accounts and files of other users.
- No one shall attempt to damage the integrity of the system.
- All users must have prior approval of the network manager before joining a newsgroup or subscribing to a listserv.

Any violation of this policy or use of the School's Internet access in an inappropriate manner can lead to revocation of student privileges and to disciplinary action.

Internet Risks

We are all aware of the existence on the Internet of material inappropriate for Latin students and of users who might seek to take advantage of other users. We are aware of potential dangers and will try to protect our students through the use of software which blocks access to sites known to disseminate inappropriate material. On a global network, it is impossible to control all materials, however, and a determined user may find ways to bypass such controls.

■

MIKSIKE: An Interdisciplinary Study Program for Elementary Schools and Home Schooling Integrated with Web Technology

Mihkel Pilv ■

Abstract

MIKSIKE is an interdisciplinary study program integrating Web technology designed to serve elementary schools and home-schooling families. Developed by a small Estonian company, MIKSIKE is divided into cross-curricular study cycles that last 3 to 5 weeks. The online program works with a standard Web browser and has three areas: (1) student worksheet templates; (2) a chat room for students, teachers, and the MIKSIKE facilitator; and (3) an Internet window.

■

Introduction

What does 'MIKSIKE' mean? Miks is the question "why" in Estonian. Miksike is the affectionate diminutive of the same word. This combination is, of course, grammatically inexact and doesn't exist in the dictionary; it is just our way of expressing how we emphasize inquiry as an integral part of the study process. MIKSIKE is a small company, which operates the MIKSIKE program. It is located in Estonia's second largest city, Tartu, which has approximately 100,000 inhabitants.

Cross-curricular Collaborative Learning

MIKSIKE is an interdisciplinary study program integrated with Web technology. It was developed to serve elementary schools and home-schooling families. Work in the MIKSIKE curriculum is divided into cross-curricular study cycles—projects and thematic units—which last from 3 to 5 weeks. Units include "Running through Time," "A Journalist's Living," "Weather Station," "To the Farm," "I Am," "Connected," "Searching for a Planet," "Make Believe Life," and "Plant Life." To facilitate collaborative learning, the program uses electronic learning resources—eTemplates—and an online support center—the eLounge.

eTemplates

eTemplates are worksheets written in HTML. Their greatest advantage is their flexibility. By using HTML editors, students can modify the content and questions on the worksheet quickly. eTemplates enable us to make the study process more creative and still preserve needed stability.

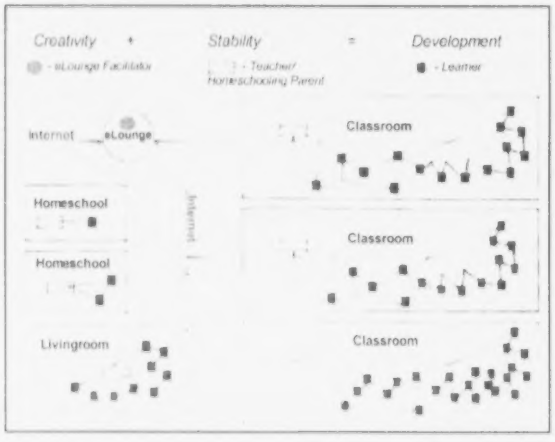

Figure 1. MIKSIKE structure.

eLounge

Modern learning does not mean only new curriculum resources, an integrated approach, and modern technology. A new kind of organization is also needed. An online support center (eLounge) is integrated into the learning activities of several classrooms or home schools at a time. The eLounge facilitator guides learners in real time. The

BEST COPY AVAILABLE

facilitator is sitting at the other end of virtual reality, that is, in the office where the MIKSIKE Web server and resources are located. eLounge services substitute for hard-copy teacher lesson plan resource books. The eLounge is similar to a live show; it guides online the collaborative learning communities who are currently working on the same project or thematic unit.

MIKSIKE Online

MIKSIKE Online (http://www.miksike.com) is our software solution, which integrates eTemplates with needed communication, collaboration, and information retrieval tools. It works through a standard browser. The browser has three regions: (1) student "eTemplates"; (2) the Chat Window, which includes students of all schools, classrooms, or home schools in different locations who are following this specific project or thematic unit; teachers and parents; the eLounge facilitator; and, if needed, a specialist that the eLounge facilitator can call in; and (3) the Internet Window (see Figure 2).

The default page during a study cycle is an eLounge home page that the facilitator has prepared for a unit. The home page does not contain ready-made answers but just hints and links to guide learners to the correct answer. In addition, a way to the real Internet is open in this area.

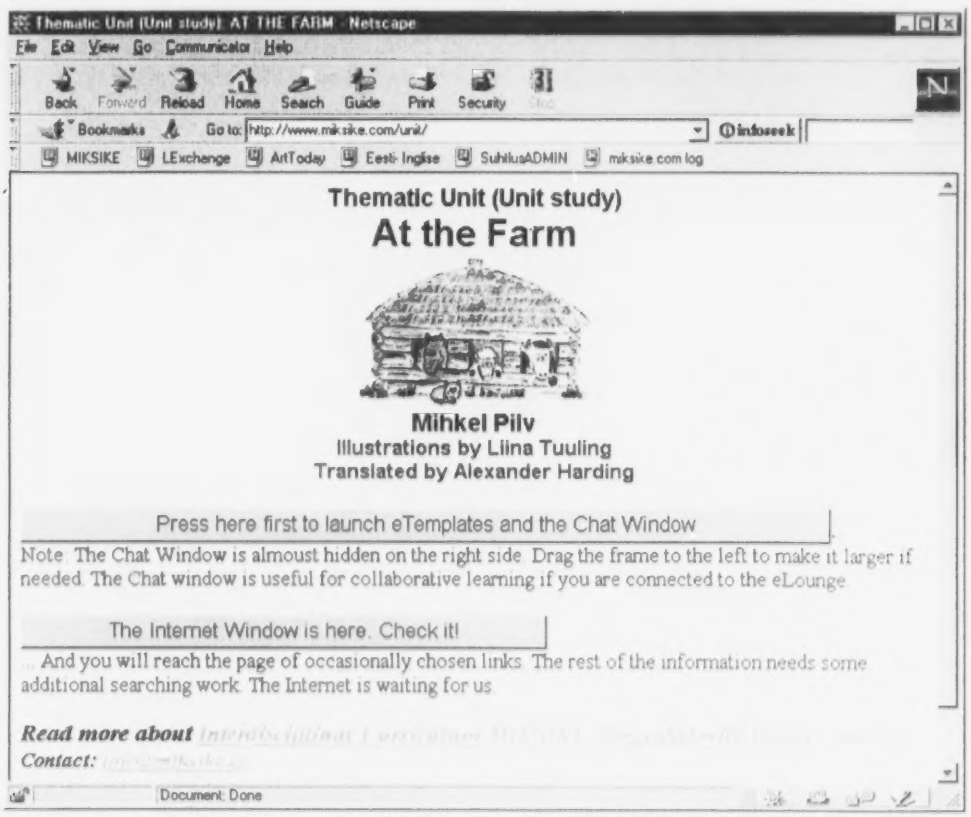
Thematic Unit (Unit study) AT THE FARM - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security
Bookmarks Go to: http://www.miksike.com/unit/
MIKSIKE LExchange ArtToday Eesti-Inglise SuhtlusADMIN miksike.com log
Thematic Unit (Unit study)
At the Farm
Mihkel Pilv
Illustrations by Liina Tuuling
Translated by Alexander Harding
Press here first to launch eTemplates and the Chat Window
Note. The Chat Window is almoust hidden on the right side. Drag the frame to the left to make it larger if needed. The Chat window is useful for collaborative learning if you are connected to the eLounge.
The Internet Window is here. Check it!
... And you will reach the page of occasionally chosen links. The rest of the information needs some additional searching work. The Internet is waiting for us.
Read more about
Contact:
Document: Done

Figure 2. Sample window.

Conclusion

Modern learning is not merely the memorization of facts prescribed by resources and curriculum from teachers and parents. Hard drives store data. The primary goal of education today lies in our ability to develop thinking skills—skills to ask questions, solve problems, and to search for information. Asking, searching, understanding, integrating, and once again searching and asking—MIKSIKE creates the necessary environment and resources for learning these skills. ■

Military Teens On The Move: An Internet Resource for Military Youth Facing Relocation

Mareena McKinley Wright, Rebecca Schaffer, Kathleen Coolbaugh, Gary Bowen, & Gina Wiley ■

Abstract

With the *Military Teens On The Move* (*MTOM*) Web site, the Office of Family Policy has implemented an innovative approach to providing relocation support for military families and children via the Internet. This paper briefly describes the design team's efforts to design, develop, and implement *MTOM*. The first section describes the process and results of an assessment of military youth needs and available resources. The second section describes *MTOM*'s design, including its goals and objectives, structure, and content. The third section describes the current pilot test of the Web site, and the fourth section identifies "next steps" in implementing the Web site across the Department of Defense. By connecting military youth to a wide range of information resources already existing on the World Wide Web and to new resources tailored to meet the unique needs of military teens facing relocation, *MTOM* intends to help teens play a more proactive role in the relocation process, reconnect quickly to their new communities and positive peer groups, and develop and maintain a positive relationship with their parents and families.

■

Introduction

Research shows that frequent relocation deprives youth of the stable support systems they need to develop healthy attitudes and behaviors and, consequently, increases the risk that they will develop problem behaviors leading to juvenile delinquency and crime. The implications of this research are of particular interest to the military, because nearly 200,000 military children ages 6 to 11 and 223,000 military adolescents ages 12 to 18 move each year, which is equivalent to approximately four times the rate of their civilian counterparts (Pittman & Bowen, 1994). In fact, many military youth move five or more times before they reach adolescence. Without a coordinated effort to provide the support that these youth need to overcome the challenges posed by frequent relocation, military youth may develop problem behaviors that range from poor school performance to antisocial behavior to drug abuse and other delinquent activity.

The Department of Defense (DoD) and the military Services, through their worldwide network of Family Centers and Youth Programs, have long provided relocation support to military families. Relocation services, however, traditionally have focused on the military Service members and their spouses. Recognizing the need to provide relocation support not only to adults but also to military youth, DoD and the military Services recently have begun to develop and implement programs to assist military adolescents during family moves. While these programs are promising in concept, they have not yet been uniformly implemented within or across the military Services.

In an effort to bridge this service gap, the Office of Family Policy (OFP) of the Under Secretary of Defense for Personnel and Readiness, Personnel Support, Families, and Education—an agency dedicated to developing and implementing coordinated policies and programs to support military families and their children—established a design team of social service researchers and computer experts to

develop a system to support military youth facing relocation. Based on an assessment of military youth's relocation needs, available military resources, and existing youth-oriented Internet resources, the design team determined that developing a Web site containing a wide array of relocation-related resources for military youth should be the first step in developing an integrated support system. Thus, the design team developed *Military Teens On The Move* (*MTOM*), a Web site that provides military youth with information and resources about the relocation process, their new installations and communities, their new schools, and other youth-oriented topics, such as colleges, jobs, and family relations (URL: http://www.mtom.com).

This paper briefly describes the design team's efforts to design, develop, and implement *MTOM*. The first section describes the process and results of an assessment of military youth needs and available resources. The second section describes *MTOM*'s design, including its goals and objectives, structure, and content. The third section describes the current pilot test of the Web site, and the fourth section identifies "next steps" in implementing the Web site DoD-wide.

Military Youth Needs and Available Resources

To assist in the design and development of this relocation support system, the design team conducted the following data collection activities:

- Reviewed literature on the impact of relocation on adolescents.
- Analyzed the content of online, youth-oriented, and relocation-focused Internet resources.
- Discussed current activities and program initiatives with the military Services' Youth and Relocation Program managers.
- Interviewed installation-level relocation and Youth Program staff.
- Conducted focus group interviews with youth about relocation issues and their access to and use of computers.

Through these activities, the design team identified the needs and concerns of relocated military adolescents and assessed both the resources available to support a youth relocation assistance system and the feasibility of an automated outreach system.

Military Youth Needs

Recent research shows that in order to adapt successfully to a move, children must accomplish the sometimes daunting tasks of separating from old friends, making new friends, adjusting to a new school and community, and maintaining positive relationships with their parents. Adolescents in particular have difficulty accomplishing these tasks because:

- They invest much of themselves in their relationships with friends and find it increasingly difficult to separate from their peer groups. Adolescents' fragile self-esteem and sometimes insufficient self-confidence can impede their ability to make friends and integrate quickly and easily into a new school and community (Pinder, 1989).
- They are increasingly concerned about their academic performance and involvement in extracurricular activities. Changing schools, therefore, may cause anxiety about adapting to new or different academic standards, course offerings, and extracurricular programs (Walling, 1990).
- The relocation process forces them to depend on their parents for continuity and support at a time when developmentally they are working on becoming independent from their parents. A move at this time may exacerbate normal tensions between adolescents and their parents, who often provide their teens little notification or information about an impending move. Parents may also be preoccupied with their own concerns about the move (Godwin, 1990; Walling, 1990).

Youth who experience relocation-related problems are more likely to feel isolated and angry during the relocation process. Without help in overcoming these problems, they may develop negative attitudes and problem behaviors (Simpson & Fowler, 1994; Catalano & Hawkins, 1995).

Although frequent relocations can place military teens at greater risk for problem behavior, the majority do not suffer from extended social isolation or become juvenile offenders. Most military adolescents successfully deal with the social disruptions and anxiety caused by moving and reintegrate into their new schools and communities. Factors that help mitigate the negative effects of relocation include:

- Strong positive relationships between relocated adolescents and their families (Pittman & Bowen, 1994; Walling, 1990)
- Access to information about their new location, the relocation process, and adolescent life in general (Pittman & Bowen, 1994)
- Strong individual coping skills, personal confidence, and positive attitudes (Catalano & Hawkins, 1995).

Youth who benefit from these internal and external resources before, during, and after a family move often develop positive personality traits, such as independence and resilience, as a result of the relocation process.

Thus, the challenge facing the design team was to develop a cost-effective information and outreach system designed to promote positive internal resources (e.g., self-confidence, resilience, communication skills) and to provide the teens with access to a wide range of external resources (e.g., information about their new installation, school, and community) that would foster positive adaptation and empower youth to become active participants in the relocation process.

Available Resources

In order to identify the resources available to support the development of this information and outreach system, the design team interviewed a number of program stakeholders. These interviews revealed that the Department of Defense and the military Services provide a wide range of relocation support services to military families. Traditionally, however, these services have focused on the adult family member. Recognizing the need to provide relocation support not only to Service members and spouses but also to military youth, DoD and the military Services recently have begun to develop and implement programs to assist military adolescents during family moves. For example, the four military Services are at various stages of developing a Youth Sponsorship Program designed to match youth facing relocation with their peers at the new installations who are responsible for welcoming the youth to the installation.

Despite the increased awareness about the importance of providing youth relocation services, resource constraints have limited the Youth and Relocation Programs' ability to develop and staff new programs or services. Thus, existing resources would have to be used to develop creative alternatives to support military youth facing relocation.

The Internet Solution

Given that military teens who are relocating are in greatest need of information and outreach services and that neither DoD nor the Services have the resources needed to develop and staff new outreach programs, OFP and the design team began exploring Internet technologies to augment adolescent relocation support activities DoD-wide.

To get a better sense of whether military teens might use an Internet Web site to obtain relocation-related resources, the design team met with military teens and Relocation and Youth Program managers and staff. Based on these discussions, the design team drew the following conclusions:

- Many military teens have both access to computers (especially at home and in schools) and experience using the Internet. They have few, if any, concerns about using computers or learning new technology.
- Youth access to computers and the Internet on military installations (i.e., at Youth Centers, libraries, and other public access locations) varies by military Service and by installation within each Service.
- The Services (particularly the Army and Navy) already have begun to provide computer labs with Internet access for military youth.
- Both military youth and program staff reacted positively to the concept of an Internet Web site as a potential educational/support resource for youth, parents, and program staff.
- The Internet has a wide range of resources on relocation and other topics of interest to teens, but locating pertinent Web sites can be a difficult and often haphazard process for them.

The results of these discussions suggested that existing technology and increasing computer availability on military installations and in military households would make an Internet Web site an ideal vehicle for providing teens, parents, and program staff with information about relocation and other topics. Thus, OFP gave the design team the go ahead to design and develop the Web site now known as *Military Teens On The Move*.

The Web Site Design

As illustrated by the conceptual model in Figure 1, the Web site is designed to help military youth overcome the problems associated with relocation, including alienation from peers, decreased school involvement and performance, negative parent–child relationships, and negative self-concepts. To this end, the Web site provides information and resources that will help youth achieve the following relocation objectives:

- Stay connected with friends and family. *MTOM* provides chat rooms and bulletin boards that youth facing relocation can use to keep in touch with friends and family at their old installations and to meet new friends *before* arriving at the new installation. These features provide quick, no-cost means to stay connected.
- Integrate quickly into the new school and community. *MTOM* teaches youth how to access installation and school home pages and how to contact teachers and counselors at the new school using the Web site's many hypertext links and e-mail. (Hypertext links enable the user to click on designated spots on the screen to move from one Web page to another without typing in a new Internet address. They allow the Web site author to create pathways for users to follow in their search for information.) *MTOM* also provides easy access to homework assistance Web sites.
- Maintain and enhance the parent–teen relationship. *MTOM* provides information about the effects of relocation on the entire family (e.g., how younger siblings may react to a move) and suggests strategies for coping with family moving strains. It also provides tips and guidelines for parents and fun relocation-oriented activities for younger siblings.
- Make informed decisions about their own behaviors and actions. *MTOM* provides a variety of tips and guidelines on relocation-related topics ranging from moving with pets to coping with stress, which are designed to help youth become active participants in the relocation process. *MTOM* also provides access to a wide range of youth-oriented Web sites that cover mental health, education, career, and other general and specific topics of interest to teenagers.

By accomplishing these objectives, youth facing relocation will increase or improve their involvement with positive peer groups, relationships with their parents, attachments to the community, prosocial behaviors, educational achievement, and positive personality traits (e.g., high self-esteem, resilience, independence). Ultimately, they will decrease their chances of developing problem behaviors.

The Web site's success in achieving these goals and objectives depends on its ability to attract and maintain the interest of teen users. Consequently, the design team has developed a user-friendly, appealing structure that provides the teen user with easy, targeted access to information and resources that address prevalent youth needs.

Structure, Theme, and Content

Military Teens On The Move contains the following main topic areas:

- Making the Move—contains relocation-related information and resources such as "top ten" lists of things to do before the move.
- Schools—contains education-related information and resources such as links to college home pages and online homework assistance networks.
- Installations—contains links to installation home page directories for each of the four military Services.
- Youth Sponsorship—contains information on DoD's Youth Sponsorship Program.
- Rules of the Road—contains information on Internet use and safety.
- News You Can Use—contains general youth-oriented information and resources ranging from personality tests to information on obtaining a driver's license to a wide range of health-related topics.

The matrix in Table 1 presents a complete list of main topic and subtopic Web pages.

Just as each main topic page contains multiple hypertext links to multiple subtopic pages, each subtopic page contains links to multiple relevant Web pages. Some of these pages were created specifically for this Web site, while others are located at other Web sites that target military or civilian teenagers. By using numerous hypertext links, *MTOM* is able to provide targeted access to

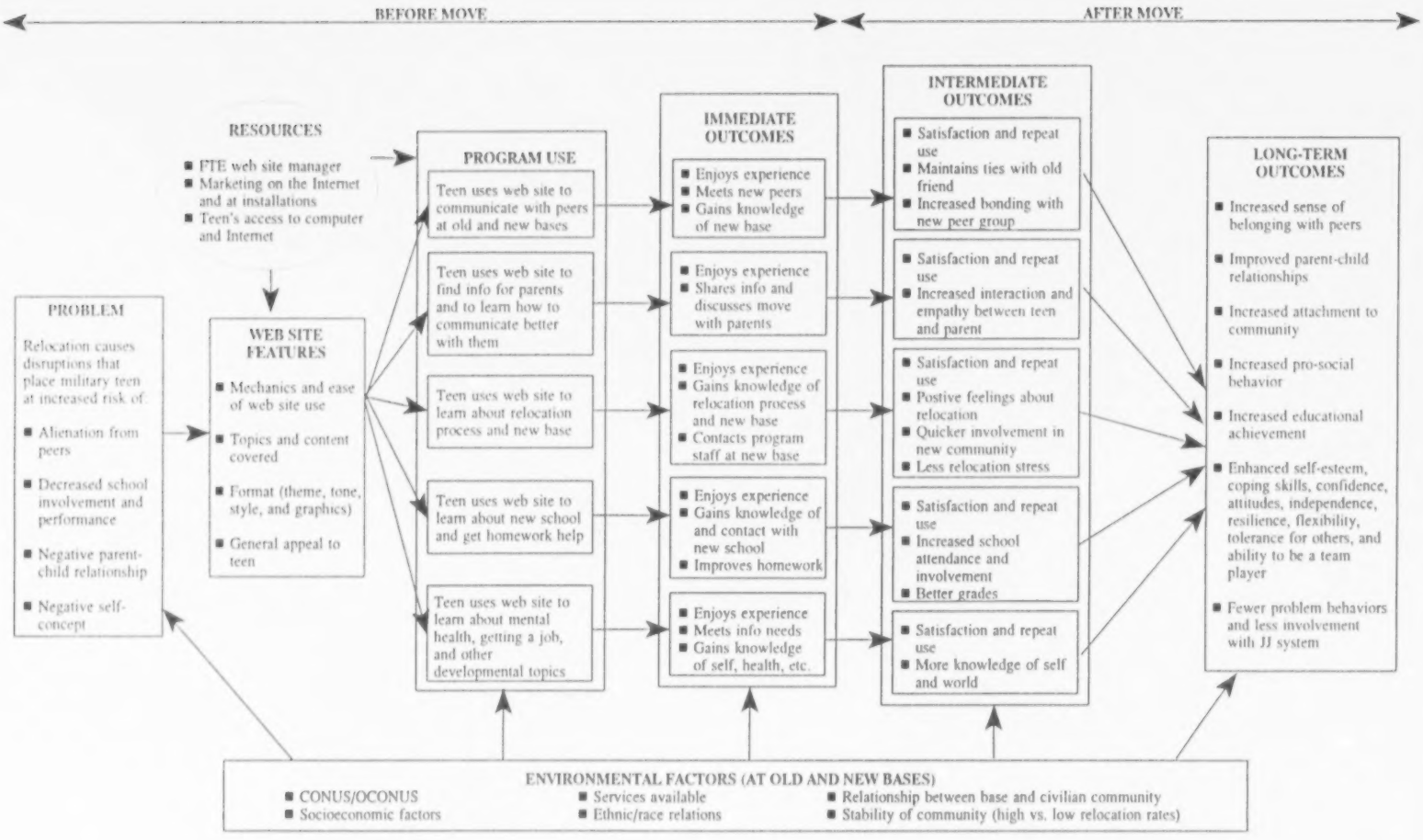
BEFORE MOVE
AFTER MOVE
RESOURCES
FTE web site manager
Marketing on the Internet and at installations
Teen's access to computer and Internet
PROBLEM
Relocation causes disruptions that place military teen at increased risk of:
Alienation from peers
Decreased school involvement and performance
Negative parent-child relationship
Negative self-concept
WEB SITE FEATURES
Mechanics and ease of web site use
Topics and content covered
Format (theme, tone, style, and graphics)
General appeal to teen
PROGRAM USE
Teen uses web site to communicate with peers at old and new bases
Teen uses web site to find info for parents and to learn how to communicate better with them
Teen uses web site to learn about relocation process and new base
Teen uses web site to learn about new school and get homework help
Teen uses web site to learn about mental health, getting a job, and other developmental topics
IMMEDIATE OUTCOMES
Enjoys experience
Meets new peers
Gains knowledge of new base
Enjoys experience
Shares info and discusses move with parents
Enjoys experience
Gains knowledge of relocation process and new base
Contacts program staff at new base
Enjoys experience
Gains knowledge of and contact with new school
Improves homework
Enjoys experience
Meets info needs
Gains knowledge of self, health, etc.
INTERMEDIATE OUTCOMES
Satisfaction and repeat use
Maintains ties with old friend
Increased bonding with new peer group
Satisfaction and repeat use
Increased interaction and empathy between teen and parent
Satisfaction and repeat use
Postive feelings about relocation
Quicker involvement in new community
Less relocation stress
Satisfaction and repeat use
Increased school attendance and involvement
Better grades
Satisfaction and repeat use
More knowledge of self and world
LONG-TERM OUTCOMES
Increased sense of belonging with peers
Improved parent-child relationships
Increased attachment to community
Increased pro-social behavior
Increased educational achievement
Enhanced self-esteem, coping skills, confidence, attitudes, independence, resilience, flexibility, tolerance for others, and ability to be a team player
Fewer problem behaviors and less involvement with JJ system
ENVIRONMENTAL FACTORS (AT OLD AND NEW BASES)
CONUS/OCONUS
Socioeconomic factors
Services available
Ethnic/race relations
Relationship between base and civilian community
Stability of community (high vs. low relocation rates)

Figure 1. Conceptual model for the implementation and outcomes of Military Teens On The Move.

the Internet's vast supply of youth-oriented information and resources. For example, *MTOM*'s "School Stuff" subtopic page (located under the "Making the Move" main topic page) contains links to other relevant pages within *MTOM* (e.g., "Tips for Changing Schools," chat rooms) and links to other Web sites, such as the Department of Defense Education Activity's Web site and several civilian school directories. These Web sites in turn link to hundreds of individual military and civilian school home pages and other school-related Web sites.

Table 1

***Military Teens On The Move* Main Topics and Subtopics**

Main Topic	Subtopics
Making the Move (Relocation)	Meeting New Friends and Staying in Touch with Old Friends Enhancing Family Relations Moving with Pets Packing and Moving Possessions Learning about New Installations School Stuff: Learning about New Schools Dealing with Stress and Other Emotions
Schools	Learning about New Schools Changing Schools Thinking and Learning about Colleges and Universities Accessing Homework and Research Assistance
Installations	Learning about Army Installations Learning about Navy Installations Learning about Air Force Installations Learning about Marine Corps Installations
Youth Sponsorship	About Youth Sponsorship Getting a Sponsor Becoming a Sponsor Activating an Installation Youth Sponsorship Program Activity Planning Guidelines Suggestions for Youth Sponsorship Activities
Rules of the Road (Internet Use and Safety)	Using the Internet "Surfing" Safety Learning "Netiquette" (Guidelines for appropriate Web user conduct)
News You Can Use (Other Adolescent Issues/Information)	Enhancing Mental Health Accessing Homework Assistance Getting a Driver's License Learning about Health-related Issues (e.g., Substance Abuse/Abuse, HIV) Going to College Planning a Career Learning about School Safety Dealing with Deployment Dealing with Relationships Getting Involved in Volunteerism

All of the pages created for *MTOM* and all of the "outside" pages that are linked to *MTOM* contain information that military teens have requested during focus group interviews with the design team and formal youth needs assessments conducted by DoD and the military Services. The information is presented in an upbeat, friendly style at a reading level that is accessible to the majority of adolescents. Moreover, *MTOM* encourages repeat use (beyond the relocation period) by providing information on a wide range of general adolescent concerns, such as health-related issues, career planning, homework assistance, and college planning. *MTOM* also provides helpful instructions on "surfing" the Internet and guidelines for Internet safety and user conduct.

Consistent with the Web site's emphasis on relocation support, *MTOM*'s text and graphics employ a "travel" theme. For example, the introductory page

of the Web site contains a large graphic of a highway that stretches to the horizon; the menu page presents the six main topic pages as destinations on a subway map; and the section addressing Internet use and safety is titled "Rules of the Road." In addition to providing an appealing presentation style, the unifying theme and consistent layout of *MTOM*'s topic, subtopic, and informational pages signal to users when they are on an *MTOM* page, as opposed to a page at another Web site linked to *MTOM*. This feature is important because outside pages often contain commands, such as "Home," that will send the user to other sections of that Web site instead of returning them to *MTOM*.

In addition to the topic, subtopic, and informational pages, *MTOM* also contains chat rooms, bulletin boards, an index, a feedback survey, and a comment option. Based on feedback from teen users, input from program staff, and developments in the field, additional features may be added to facilitate use of the Web site and to increase its overall appeal to teen users.

The Pilot Test

The design team is currently conducting a pilot test of *MTOM* to gather feedback on the Web site's design and utility and to assess the extent to which the Web site meets the project's overall youth relocation support objectives. This pilot test includes two components: automated Web site monitoring and a series of installation site visits.

Automated Monitoring System

The automated monitoring system provides information about the number of users that access *MTOM*, the amount of time they spend on the Web site, the location of the computers used to access the Web site, and the pages of *MTOM* most often accessed by users. This information is obtained from automated access logs of *MTOM* use, which are compiled by the server on which *MTOM* resides. In addition, new *MTOM* users are invited to complete a short demographic profile when they enter the Web site. *MTOM* also has an online feedback survey, which invites users to give their impressions of the Web site, as well as basic demographic information. Finally, *MTOM* has a general "comments" feature that allows users to send a message directly to the webmaster. These features are being used to assess the extent to which the Web site is used and enjoyed by the targeted audience.

Automated Web site monitoring reveals that between August 5, 1997, and October 1, 1997, *MTOM* was visited 698 times (or had 698 "hits"). Web site use logs also indicate that the most frequently visited sections of *MTOM* include "Schools," "News You Can Use," and "Youth Sponsorship." Thus far, too few new user profiles, feedback surveys, and comments have been collected to report any meaningful findings about the utility and appeal of the Web site.

Installation Site Visits

While the automated monitoring system provides basic information about *MTOM* users, it provides only limited insight into *how* adolescents use the Web site, whether they experience any difficulties accessing or using the site, and whether the information provided is helpful to them. To gather this type of data, the design team has conducted site visits to multiple installations to demonstrate the Web site, observe teens using the Web site, and interview and survey teens and installation-level youth and relocation program staff following the Web site demonstrations.

In general, response to *MTOM* has been overwhelmingly positive. A sampling of teen comments includes:

- "I am very Internet literate and am very impressed."
- "It looks like a very helpful thing to teens...in the military. I think it's a really good program!"
- "It was very well planned and is easy to find what you're looking for."
- "It was cool. Very informative."
- "Has a lot of good information on all the things on the bases to help kids and teens."
- "Gives us an easy way to communicate with friends that we've left behind."
- "It links military teens together, makes moves easier."
- "I like the set-up and the information. I only wish it were made sooner."

Teen users also suggested improvements to the Web site, such as using more exciting graphics and special effects, adding other topics or subtopics,

and involving military teens in the maintenance and further development of *MTOM*. A majority of the teen respondents indicated that they would be interested in helping to update and maintain the Web site in the future.

The Youth and Relocation Program staff were also excited about *MTOM*. A sampling of adult comments includes:

- "A lot of very good information which will help all Youth Centers in the [Services]."
- "It's a great index for youth."
- "Can't wait to check it out at home."
- "Fantastic. It's great that the students can have access to this information."

Adult users also suggested involving teens in *MTOM* maintenance. Youth Center staff expressed concerns about obtaining Internet access and desired additional information about developing installation-level Youth Program Web sites.

Next Steps

To ensure that the Web site reaches its full potential as a sustainable relocation assistance and outreach program, OFP must complete the following steps:

- Develop a marketing plan for *MTOM*.
- Establish a method to update and maintain the Web site.
- Develop *MTOM*'s potential as a program development tool.

The remainder of this section describes each of these steps in more detail.

Develop a Marketing Plan for MTOM

Several marketing tools already have been developed to generate interest in the Web site at installations involved in the pilot test. The design team developed a multi-color glossy bookmark displaying *MTOM*'s logo, URL, and a brief description of the Web site. The team also designed T-shirts displaying the metro map graphic used on the *MTOM* menu page, a banner that states "Ask me about *Military Teens On The Move*," and the Web site's URL. Both items have been well received by both teens and adults at the installations included in the pilot test. In the future, the bookmarks could be included in installation welcome packets or handed out at installation Family Centers, Youth Centers, libraries, schools, and computer labs to promote use of *MTOM* by military youth. The T-shirts could be sold at program fund raisers or used as rewards or door prizes for various youth-oriented activities.

The design team is currently developing a marketing plan to promote DoD-wide use of *MTOM* after the pilot test. Under this plan, marketing efforts will include indexing *MTOM* in major search engines (e.g., Yahoo!ligans, Lycos), inviting related Web sites (e.g., Adolescence Directory On-Line) to link to *MTOM*, nominating *MTOM* for Internet awards, and advertising the Web site in military- and family-related media. These multiple marketing efforts will ensure that *MTOM* gains high visibility in the military community—especially among military youth.

Establish a Method to Update and Maintain the Web Site

Ongoing maintenance will be required to keep the Web site up to date. Typically, a designated "webmaster" monitors use of the Web site and its various pages; responds to e-mail concerning the Web site; compiles feedback and survey data collected on various pages of the Web site; and updates the Web site's text, graphics, and hypertext links. Based on teen responses to the pilot test, it is clear that they desire a role in this process. OFP and the design team must establish Web site maintenance requirements and guidelines before the Web site can be marketed DoD-wide.

Develop MTOM's Potential as a Program Development Tool

MTOM has the potential to support Youth and Relocation Programs at both headquarters and installation levels by providing program staff with the following resources:

- Outreach tool. *MTOM*'s hypertext links to local program resources and activities could provide a cost-effective means of augmenting the existing human service delivery system for youth on military installations.
- Needs assessment tool. *MTOM*'s automated monitoring capability could be used to assess latent demand for programs and identify needs for future program development.
- Program development tool. *MTOM* could support installation-level Youth Sponsorship Programs by assisting teen participants in building and maintaining their installations' Youth

Sponsorship Web pages. Web site related activities could serve as either the foundation for an installation's sponsorship program or an adjunct to an existing program.

In addition to these state-of-the-art electronic tools, *MTOM* also could provide an inexpensive online forum for military adolescents to express their needs and interests directly to Youth and Relocation Program staff at DoD, Military Department Headquarters, and installations via the Web site bulletin board and chat room.

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Teachers! Parents! Beware of RSI

Sandra Ubelacker ■

Abstract

Musculo-skeleton injuries, which include tendinitis, carpal tunnel syndrome, chronic neck and back pain, and other Repetitive Strain Injuries (RSI), are the leading causes of disability in working-age people in North America. Studies indicate that computer users are especially susceptible to these injuries; therefore, the keyboard techniques, computer practices, and workstation routines established in the early years are key to preventing injuries throughout life. This paper stresses the importance of the role of teachers and parents in the prevention and identification of RSI. Attention is given to carpal tunnel syndrome, eye strain, and neck and back pain. Three bad habits are identified with suggestions as to how they may be prevented.

■

Introduction

The practices and routines established in our early years tend to remain for a lifetime and are difficult, if not impossible, to change.

Did you know that musculo-skeletal injuries, which include tendinitis, carpal tunnel syndrome, chronic neck and back pain, and other Repetitive Strain Injuries (RSI), account for 60% of workers' compensation claims? Did you know that RSI is the leading cause of disability in working-age people in North America with 19 million people affected?

RSI has hit the largest single occupational group ever—computer users. Studies reveal that one-fifth to one-quarter of computer-keyboard users have RSI symptoms. The Bureau of Labor Statistics reports that, on average, it takes employees longer to return to work after sustaining carpal tunnel syndrome than any other disabling injury, including amputation. Our students in school today are the workers of tomorrow and are using computers from an early age.

Do parents and teachers have a role in the prevention of RSI (also known as cumulative trauma disorder or CTD)? Will today's students become tomorrow's statistics with the rampant increase in RSI in the workplace? It is very common for an 8-year-old to use a computer both at home and in school, and it is increasingly evident that students use computers from elementary school through high school. Parents and teachers must pay attention to correct computer use—RSI is preventable.

Have you heard of anyone commonly complain about tired hands, pounding pain in the wrists, no feeling in the fingers, sore shoulders, or lower back pain? If your answer is yes, this person, even the very young, may be suffering from "secretaries' hands" or what has become known as Repetitive Strain Injury (RSI) because they are using the computer the wrong way.

Carpal Tunnel Syndrome

The most serious injury is carpal tunnel syndrome. Carpal tunnel syndrome is caused when the wrists are flexed and in an awkward position, with the muscle strained (Figure 1). The blood supply to the carpal tunnel in the wrist is interrupted, pinching the nerves. The injury is very painful and can result in surgery, extensive physiotherapy, and the need to wear wrist braces when keyboarding.

Bad Habit 1

Have you every watched children play computer games? Did you notice how they rest the palms of their hand on the desk or keyboard, sometimes with their thumbs folded under the keyboard or desk? The weight of the hand is now on the palms, putting pressure on the tendons and nerves and cutting off

the blood supply. This habit is probably the *most difficult to change* when learning to "touch type" and will eventually lead to carpal tunnel syndrome. Keyboard wrist rests are not a solution or a corrective measure. If the weight of the hand is transferred from the edge of the keyboard or table to the wrist rest, nothing has changed. The position of the hand must change without resting on any surface. Every computer user should learn to "touch type"—the younger the better. Small hands learn to play the violin. Small hands can learn to touch type.

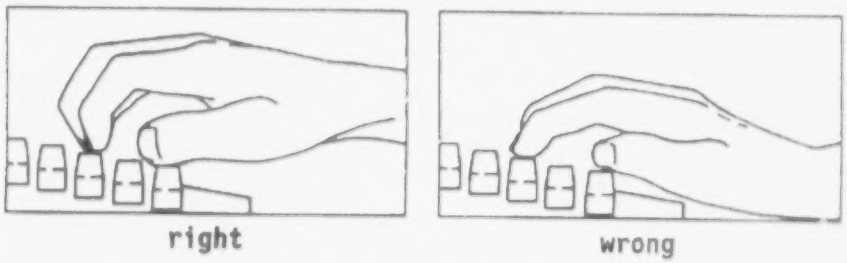


Figure 1. Hand slant.

Prevention: Hand and body aerobics. It is recommended that for every hour on the keyboard, there should be a 10-15 minute break. During this break, exercises should include shoulder, arm and hand stretches, neck stretches, and upper body stretches (Figures 2–4). These exercises include:

1. Extending the fingers in spread eagle fashion, holding them for five seconds and then relaxing.
2. Rotating the wrists clockwise and counterclockwise followed by shaking out the hands.
3. Pressing each hand forward and backwards.
4. Looking slowly to the right and then slowly to the left or slowly tilting the head to the left and right.
5. Stretching both hands above the head, behind the back, and in front of the body to stretch the upper body.

Computer software can be purchased to guide students through these various exercises.

Keyboarding: The magic bullet. As soon as the computer is used as a "writing tool," proper keyboarding techniques should be taught. These techniques include correct posture—fingers curved, wrists low, palms above the keyboard; correct fingering; proper use of the enter key, space bar, and shift key; and control—arms motionless, elbows at side, and wrists relaxed; and good workstation habits—sitting upright with feet flat on the floor, keeping a neat work surface, and managing disks properly. *A teacher, not software, is the most important factor in the initial learning.* Software cannot determine if fingering, posture, arm and wrist position, or eyes on copy are correct. Software should be used for remedial work, not for initial learning. The habits formed in this initial learning tend to remain for a lifetime.

Eye Strain

Your eyes were not designed to stare at the same distance all day long. This practice causes eye soreness or fatigue, dry eyes, or blurred vision. There is a growing belief that shortsightedness may occur in the long run.

Bad Habit 2

Have you ever seen children, either alone or in groups, so engrossed by what is on the computer screen that they are either standing or sitting with their eyes just inches from the screen? This attention to the screen seems to go on for a long period.

Prevention: Eye exercise and lighting. Your eyes need exercise. Look away from the monitor to focus on different distances in the room. There are computer programs that give "vision aerobics." At various timed intervals, objects appear, leading the eyes around the screen.

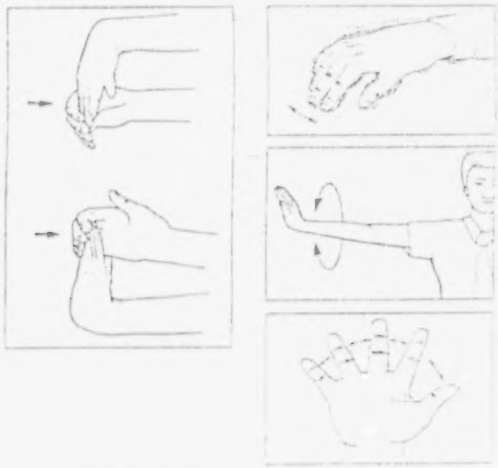


Figure 2. Shoulder, arm, and hand stretches.

Outside light competes with the monitor screen. If the monitor faces a window, shut the blinds or move the monitor away from the windows or other sources of bright light. Reflect light away from your eyes. Glare is a problem when light bouncing off the monitor strikes the eyes. If possible, tilt the monitor if it is reflecting overhead light. In schools, computer labs require less area illumination than a typical classroom.

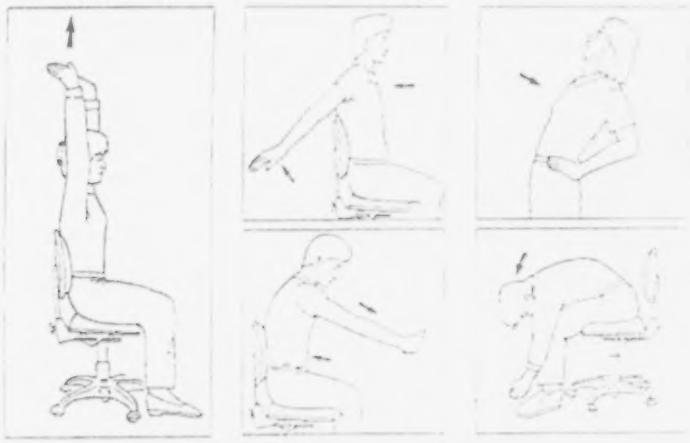


Figure 3. Upper body exercises.

Neck and Back Pain

Neck and back pain are common complaints. The cause is usually poor posture, which decreases blood flow to certain muscles. These muscles stiffen up and hurt.

Bad habit 3

Have you ever noticed how children sit at their computer? Are their legs in one of these positions: wrapped around the legs of the chair, wrapped around each other, one leg resting on the other knee; or one leg tucked under their body?

Prevention: Good posture and workstation design. Ten basic principles of good posture in an appropriate workstation are (Figure 5):

1. The eyes are level with the middle of the screen.

2. The chin is tucked in.
3. The elbows are at 90 degrees.
4. The wrists are neutral, not raised up.
5. The shoulders are relaxed.
6. The knees and hips are level or the knees are slightly lower.
7. The back of the chair supports the small of the back.
8. The height of the chair touches the tip of the shoulder blades.
9. The feet rest on a foot rest if the legs are short or the chair is too high.
10. If a ruler is placed from the ear to the hip, it would be in a straight line parallel with the spine in good posture.

Figure 4. Neck exercises.

The height of the keyboard affects posture. The keyboard should be at about seated elbow height to encourage keying with straight wrists and relaxed shoulders. If a mouse is used, position it at the same height and as close as possible to the keyboard. A copy holder can prevent neck strain and reduce eye fatigue if it is placed at eye level and at the same distance from your eyes as the monitor and fairly close to it. Wrist rests, when used properly, can reduce pressure and improve wrist posture and comfort. The wrists must remain straight to avoid stress or pressure on tendons and nerves.

Business education teachers have been attentive to good posture and workstation design when teaching keyboarding, word processing, and information processing courses. Is this as true when teaching spreadsheets, databases, and other programs such as drawing, painting, and accounting programs? Computers (formerly typewriters) are no longer the domain of the business education program. Computers are used across the curriculum—especially with the new interest in multimedia, the Internet, e-mail, and using the computer as a writing tool. As people become as expert in computer use as in pen and pencil use, the "whole child" sometimes is forgotten. The focus is on the computer and what it can do. What about the child using the computer? As the computer keyboard becomes an extension of the hands, equal attention should be given to the whole body. "The sum of the parts is greater than the whole."

Six Easy Steps to Prevent RSI

1. Learn to "touch type"—the skill will last a lifetime.
2. Take a break.
3. Stretch your hands and upper body.
4. Look away from the screen occasionally.
5. Reflect light and glare away from your eyes.
6. Sit properly at an appropriate computer workstation.

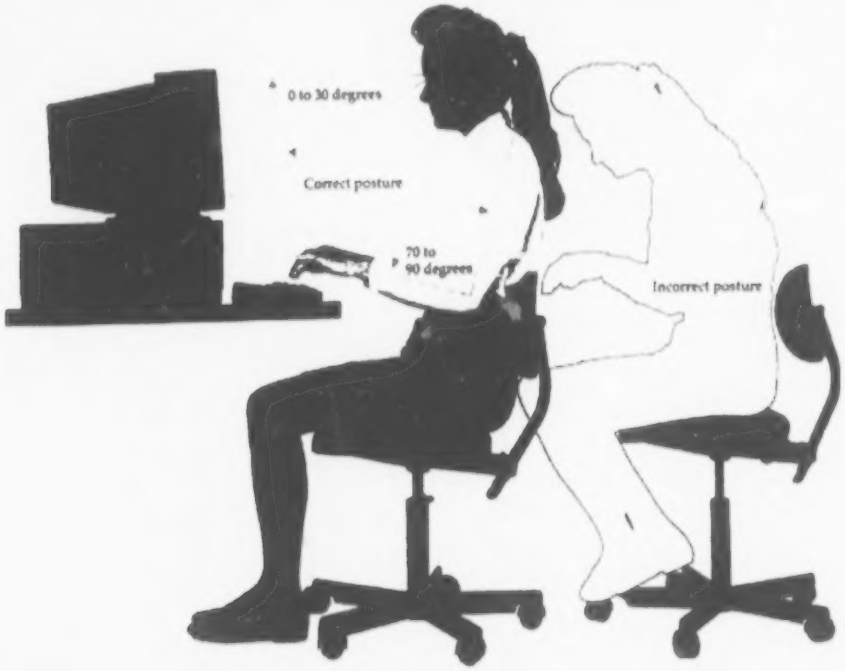


Figure 5. Correct posture.

The practices and routines established in our early years tend to remain for a lifetime and are difficult, if not impossible, to change. It is more important than ever that attention be given to the prevention of RSI. These injuries once acquired are debilitating and last for life. What have we, as parents and teachers, done to impress the importance of RSI prevention on our children or students and on our colleagues in the elementary and junior and senior high schools teaching in areas where computers are used? What is our responsibility as parents and teachers? Would you have a 16-year-old take driving lessons from someone who does not know how to drive?

The following resources provide more information on safe computer use.

1. Scott, Jennifer. (1994, January 26). Computer ills. In Randy Werle (Producer), *The Health Show*. Toronto: CBC Television.
2. Bueckert, Lynn, & Weninger, Lois. (1992). *Repetitive strain injuries in the workplace*. Burnaby, BC: Women and Work Research and Education Society.
3. Larson, Nancy, MacLeod, Dan, Kennedy, Eric, Adams, Wayne & Meier, Christine. (1994, May). An ergonomics guide for computer users. *Computer Paper, 7*(5), 10-15, 26-27.
4. Leitch, Andrew. (1995). Sidelined by the keyboard. *Occupational Health & Safety Magazine, 18*(1), 14-16.
5. Pascarelli, Emil, & Quilter, Deborah. (1994). *Repetitive strain injury: A computer user's guide*. New York: John Wiley.
6. Paul, Lauren Gibbon. (1997, March 19). *Is your child risking RSI?* [Online]. Available: http://www.thesite.com/0397w4/life/life423_031997.html.

■

ERIC/CASS Virtual Libraries:

Online Resources for Parents, Teachers, and Counselors

Garry R. Walz & Jeanne C. Bleuer ■

Abstract

The Educational Resources Information Center (ERIC) is a federally funded program that was inaugurated in 1966 to serve as the nation's archive of important education documents. ERIC clearinghouses identify, select, and prepare entries describing education-related materials for the ERIC database; provide information in response to mail, telephone, and electronic requests as part of the AskERIC service; conduct education-related workshops; and publish numerous hard-copy and electronic resources. One of 16 ERIC clearinghouses, the ERIC Clearinghouse on Counseling and Student Services (ERIC/CASS) serves counseling and student professionals as well as parents who have an interest in personal and social factors that affect learning and development. ERIC/CASS has developed virtual libraries to provide online access to full-text documents on topics within its scope. In addition to a virtual library of career development resources developed with the National Occupational Information Coordinating Committee (NOICC), virtual libraries developed in 1997 include: (1) Learning and Achievement; (2) Substance Abuse; (3) School Violence; (4) School-to-Work Transition; and (5) Multiculturalism, Diversity, and Pluralism. To make the libraries easy to search, documents are cross-referenced and can be accessed through four categories: Subject Area, Population, Resources for Parents, and NOICC Resources.

■

Introduction

As the developer of the world's largest and most frequently used education database and a pioneering leader in offering an Internet-based question-answering service, ERIC—the Educational Resources Information Center—is ideally suited to take leadership in the development of online virtual libraries. The virtual libraries described in this paper provide users with immediate, well-organized access to the full-text of hundreds of useful articles and documents on topics of high interest not only to education and counseling professionals but also to parents, students, and the general public.

What Is ERIC?

ERIC is a federally funded program that was inaugurated in 1966 to serve as the nation's archive of important education documents. Over the years, the role of ERIC has expanded to incorporate not only the collection and storage of education-related information but also the generation of new information through publications and newsletters, the dissemination of information through question-answering services, and the provision of training in the use of information through workshops and conference presentations.

ERIC currently consists of a network of 16 subject-specific clearinghouses, 10 adjunct clearinghouses, and 4 supporting service components. It is sponsored by the U.S. Department of Education, Office of Educational Research and Improvement, and is administered by the National Library of Education.

What Resources Does ERIC Offer?

- Access to "fugitive" documents such as research reports, curriculum guides, and conference papers through *Resources in Education* (RIE) and the ERIC microfiche collection.
- Access to citations and annotations of articles from more than 900 education-related journals through the *Current Index to Journals in Education*.

- Question-answering services via toll-free phone numbers, fax, mail, e-mail, and in-person visits to clearinghouses and professional conference exhibits.
- Skill-building workshops on topics of high critical need and interest.
- Scope-specific publications that meet the information needs of each clearinghouse's audience.
- Opportunities for education professionals as well as parents and the general public to share their ideas, products, and research with one another through submission of documents to the ERIC database or participation in listservs.

How Accessible Are ERIC Resources?

- The ERIC database is available in print, online, and CD-ROM versions.
- ERIC searching products and services are offered by four private online database vendors and five CD-ROM vendors.
- ERIC can be searched on the Internet at several ERIC Web sites.
- Access to ERIC microfiche and publications is provided by more than 1,000 institutions in 27 countries.
- An electronic question-answering service is provided by AskERIC.
- ERIC Web sites provide up-to-date information on ERIC and ERIC clearinghouse services and activities.

What Is ERIC/CASS?

The ERIC Clearinghouse on Counseling and Student Services (ERIC/CASS) at the University of North Carolina at Greensboro (UNCG) is one of the original ERIC clearinghouses established in 1966. ERIC/CASS is the ERIC clearinghouse that serves counseling and student services professionals as well as parents and others who have an interest in personal and social factors that affect learning and development. Examples of topics addressed by ERIC/CASS include drugs, self-efficacy, conflict resolution, abuse, equity, life/career planning, and family functioning.

ERIC/CASS Virtual Libraries

During the past 2 years, ERIC/CASS has undertaken a special initiative to develop several online virtual libraries. Each virtual library is designed to provide users with online access to an extensive array of full-text documents on a topic of current high interest or critical concern.

Advantages of a Virtual Library

- Ease of accessibility.
- Low cost.
- As intensive or extensive as desired.
- Easy to update and expand.
- Minimal hassle due to loss or non-return of borrowed items.

Disadvantages of a Virtual Library

- Sometimes not as accessible or portable as libraries composed of "dead tree" (paper copy) items.
- Potentially intimidating to "non-techy" types.
- Can leave people feeling bereft at the lack of the feel and heft of a real book.
- May appear to be difficult to scan for general impressions or skim for specific items.
- Under the mantle of the Internet, may acquire an unwarranted reputation for objectivity and accuracy.

The ERIC/CASS–NOICC Virtual Library of Career Development Resources

The first virtual library developed by ERIC/CASS was sponsored and funded by the National Occupational Information Coordinating Committee (NOICC) through a grant from its Career Development Training Institute (CDTI) program. With valuable input from NOICC's Executive Director, Dr. Juliette Lester, and the North Carolina State Occupational Information Coordinating Committee Director, Nancy MacCormac, ERIC/CASS staff collected, reviewed, scanned, and converted to HTML hundreds of useful ERIC documents, ERIC Digests, NOICC publications, and other non-copyrighted materials.

In addition to the input of existing materials, ERIC/CASS's Virtual Library Webmaster, Rob Bohall, developed numerous links to other relevant Web sites, and ERIC/CASS Director, Dr. Garry Walz, developed a set of frequently asked questions and answers of special interest to parents.

To make the library easy to search, documents are cross-referenced and can be accessed through four categories: Subject Area, Population, Resources for Parents, and NOICC Resources. In addition to the full text of several items in each area, an annotated bibliography of other relevant resources is provided.

ERIC/CASS Virtual Libraries: New for 1997

Based on the success and positive feedback on the ERIC/CASS–NOICC Virtual Library of Career Development Resources, ERIC/CASS, through special project funding from ERIC, developed five more virtual libraries during the first 6 months of 1997. They are:

- Learning and Achievement
- Substance Abuse
- School Violence
- School-to-Work Transition
- Multiculturalism, Diversity, and Pluralism

These five new libraries were modeled after the career development library in that they provide user-friendly cross-references to documents, links to other relevant Web sites, and annotated bibliographies of additional resources. Lists of the specific topics covered in all six virtual libraries are provided in Appendix A, and a summary of URLs to access each of the libraries is provided in Appendix B.

Coming in 1998

ERIC/CASS is currently collecting and organizing resources for six more virtual libraries to be ready for public access by June of 1998. They include:

- Conflict Resolution
- Depression and Suicide
- Gangs
- Bullying
- Juvenile Boot Camps
- Assessment in Counseling and Therapy

APPENDIX A

Virtual Library Categories

- **Career Development Virtual Library**
  http://www.uncg.edu/edu/ericcass/career/index.htm

Subject Areas
- Computerized Guidance and Information
- School-to-Work Transition
- Assessment and Portfolios
- One-Stop Career Centers
- Comprehensive Career Development
- Career Counseling Interventions
- Program Evaluation
- Labor Market Trends and Information
- Staff Development and Training

Specific Populations
- Adults
- College Students
- Ethnic Groups
- K–12 Students
- Non-Employed
- Out-of-School Youths
- Persons with Disabilities
- Women

Job Search Sites
- America's Job Bank
- America's Talent Bank
- Canada Work Network
- Career Magazine
- Career Path
- E-Span
- JobBank USA
- JOBTRAK
- The Monster Board
- Online Career Center

Resources for Parents
- Career Exploration and Decision-Making
- College Selection and Financial Aid
- Employment Bound Youth
- Employability Skills
- Frequently Asked Questions
- Job-Seeking Skills
- Related Organizations
- Training Options
- Work-Based Learning

NOICC Resources
- Links to SOICC's
- National Career Development Guidelines
- NOICC Occasional Papers
- Products and Services

Reference Shelf
- Index of On-Site Documents
- Virtual Library FAQs
- Index of On-Site ERIC Digests
- Lists of Links: Careers, Labor Market
- New Acquisitions
- User Survey
- Virtual Library FAQ's

- **Cultural Diversity Virtual Library**
  http://www.uncg.edu/edu/ericcass/diverse/index.htm

Student Level
- Early Childhood and Elementary
- Secondary
- Higher Education
- Adult Education

Ethnic Groups
- Asian
- Black
- Hispanic
- Native American

Practitioner Role
- Administrators
- Counselors
- Teachers

Special Needs Students
- Gay/Lesbian
- Limited English Proficient
- Migrant Students
- Students with Disabilities

Resources for Parents
- Family Influence on Students
- Helping Plan for the Future
- Parent/School Relationship

Special Topics
- Assessment
- Bilingual Education and ESL
- Discrimination in Education
- Promising Programs

- **School-to-Work Transition Virtual Library**
  http://www.uncg.edu/edu/ericcass/stw_tran/index.htm

Student Level
- Elementary
- Secondary
- College/Postsecondary

Effective Programs
- Creating and Evaluating Programs
- Current Issues
- Employers and STW
- Successful Practices

Practitioner Role
- Administrators
- Counselors
- Teachers

Special Topics
- Career Development
- Legislation and Policy
- Performance Standards
- Special Needs Students

Resources for Parents
- Family Influence
- Parental Involvement
- School-To-Work Basics

- **Substance Abuse in Education Virtual Library**
  http://www.uncg.edu/edu/ericcass/substnce/index.htm

Student Level
- Elementary
- Secondary
- College/Postsecondary

Specific Substances
- Alcohol
- Illegal Drugs
- Steroids
- Tobacco

Practitioner Role
- Administrators
- Counselors
- Teachers

Resources for Parents
- Communication
- Treatment
- Prevention
- Signs of Abuse

Special Topics
- Peer Counseling
- Pre-Natal Exposure
- Promising Programs
- Rehabilitation

- **Student Learning and Achievement Virtual Library**
  http://www.uncg.edu/edu/ericcass/achieve/index.htm

Student Level
- Elementary
- Secondary
- College/Postsecondary

Special Needs Students
- Economically Disadvantaged
- Ethnic Minorities
- Gifted and Talented
- Students with Disabilities

Practitioner Role
- Administrators
- Counselors
- Teachers

Resources for Parents
- Specific Curriculum Areas
- Improving Academic Skills
- Family Impact
- Testing and Grades

Special Topics
- Student Motivation
- Alternative School Searches
- Career Planning

- **School Violence Virtual Library**
  http://www.uncg.edu/edu/ericcass/violence/index.htm

Student Level
- Elementary
- Secondary
- College/Postsecondary

School Safety
- Punishment and Intervention
- School Environment
- Security Measures
- Violence Policy

Practitioner Role
- Administrators
- Counselors
- Teachers

Resources for Parents
- Avoiding Violence
- Dealing with Violent Children
- Family Influence
- Parent/School Relationship

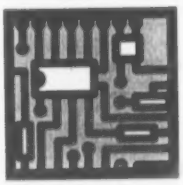
Special Topics
- Corporal Punishment
- Crisis Intervention
- Guns
- Media Impact

APPENDIX B

Virtual Library URLs

- Career Development
  http://www.uncg.edu/edu/ericcass/career/index.htm
- Cultural Diversity
  http://www.uncg.edu/edu/ericcass/diverse/index.htm
- School-to-Work Transition
  http://www.uncg.edu/edu/ericcass/stw_tran/index.htm
- School Violence
  http://www.uncg.edu/edu/ericcass/violence/index.htm
- Student Learning and Achievement
  http://www.uncg.edu/edu/ericcass/achieve/index.htm
- Substance Abuse
  http://www.uncg.edu/edu/ericcass/substnce/index.htm

equity



How do we achieve equity in family access to computing technology? Given the concern that computer use further separates the "haves" and "have nots," many community-based programs are working to increase Internet and computer access among underserved children and families. The parents attending the FTE conference were unanimous in their concern about equity and their hope that technology can be accessible to *all* families and *all* schools.

The papers in this section address a variety of equity concerns. Addressing equity may mean adapting models developed in other sectors—such as large organizations like the military—for families. Edward J. Degnan and John W. Jacobs describe the application of a military model for technology integration to five communities that are using technology integration methodology to create extended learning communities that are inclusive of all community members. The use of technology in adult education and family literacy programs (Susan Imel and Judy Wagner) is another strategy that is being tried to address community-wide equity issues. Focusing on students' out-of-school time is another strategy (Ken Komoski), and one used by a variety of communities in the LINCT Coalition (a nationwide collaborative of socially concerned, nonprofit organizations working together to help communities achieve universal access to electronic information and learning via community networks and the Internet). Responding to parents' information needs using technology is also described in this section (Ron Banks and Anne Robertson). Other efforts include NeighborhoodLink (Mary Ellen Simon). Finally, Anthony Wilhelm discusses Hispanic families' uses of technology.

Not included in this section are the following papers presented in this strand at the conference:

Cyndy Colletti, *Fostering Family Literacy through CD-ROMs*
Eileen E. Faucette, *Increasing Appropriate Technology Usage*
Erwin Flaxman, *Families, Empowerment, and Technology*

As the papers in this section suggest, *access* and *equity* mean much more than simple physical accessibility of computer equipment to all families. There is the issue of intellectual accessibility—providing information on the Internet at many different reading levels and in a variety of languages—as well as the issue of providing information in "user-friendly" ways and making such information easy to find on an increasingly crowded and complex Internet information highway.

Dual-Use Technology: A Total Community Resource

Edward J. Degnan & John W. Jacobs ■

Abstract

Many large organizations are seeking technological solutions to compensate for reduced manpower and funding resources. One such organization, the U.S. Army, has compensated for resource reductions by focusing on integrating advanced technologies into the functional areas of training, acquisition, and test and evaluation. While there are some unique military aspects of the methodology, overall the application can work for any organization trying to incorporate technology into an educational or work environment. Taking a systematic technology integration methodology from the military and applying it to communities to form an expanded learning environment has proven to be a cost-effective way to initiate technology integration. In order to accomplish an effective technology integration effort, a three-phased approach was developed that is adaptable to a variety of communities and educational organizations. Key Phase I activities that make the methodology successful include early identification of available technology resources and working closely with change agents to assist them in developing a vision of how to use all the resources that are available within a given community. Resources can then be allocated in such a fashion that they can support the overall community needs and goals. Within Phase II activities, developing a technology education program for all stakeholders is very important. This program should include a train-the-trainer component so that critical information can be transported to the various participant groups in a timely manner. Phase III involves incorporating various technology applications within the school system and targeted local community organizations. Currently, there are five communities that have been going through this process for varying lengths of time over the past 3 years. Through this technology integration methodology, an extended learning community can be created that provides a system for inclusion of all community members by maximizing the use of all available resources through dual use of those assets.

■

Introduction

Many large organizations are seeking technological solutions to compensate for reduced manpower and funding resources. One such organization, the U.S. Army, has compensated for resource reductions by focusing on integrating advanced technologies into the functional areas of training, acquisition, and test and evaluation. The Army's modernization effort is continuous in nature and is based on a systematic technology integration approach. This modernization effort resulted in a complete internal and external review of operational activities for the purpose of restructuring and transforming the working and training environment through the application of advanced technologies such as simulation, virtual reality, and network communication architectures.

While there are some unique military aspects related to this modernization approach, the basic principles and methods can be applied to other organizations attempting to incorporate technology into an educational or work environment. Key elements of the technology integration approach are its emphasis on identifying and overcoming obstacles to the change process and its emphasis on seeking dual use for equipment and resources. Although dual use of technology/resources is one of the cornerstones of cost-effective access to equipment and software, an organization must specify its needs and requirements in advance so that a given resource (e.g., equipment, facilities, and personnel) can be used in an optimal way to support the organization's goals.

The purpose of this paper is to provide a framework for educators, government officials, and private industry that allows for high-tech equipment and software to be integrated in a cost-effective manner for multiple users and environments. To achieve this goal, thorough planning and coordination processes must occur before the first piece of equipment is purchased. Planning processes include:

- identifying and clearly specifying technology integration requirements,
- assessing the current status of the technology availability and application within each specific user environment,
- developing a forecast of future technology, and
- projecting availability of resources needed to support current and future requirements.

Based on the results obtained during the planning process, long- and short-range technology integration plans are developed. These plans should emphasize dual use of technology to the greatest extent feasible across functional boundaries. Milestones should be determined along with specific quantitative outcomes for each milestone to provide a basis for determining whether progress toward the required end state has been achieved.

Problem Statement

Technology can overcome the obstacles now facing most public school districts and communities across the nation. These obstacles include: (1) limited English language proficiency, (2) physical isolation of individuals and in some instances schools, (3) inequity of resources, (4) administrative inefficiency, (5) lack of access to job training, and (6) lack of transfer of academic knowledge to work settings.

While emergent technologies such as computers, networking, and simulation have been shown to enhance learning outcomes, the overall impact of emergent technologies on U.S. schools and communities has been limited. A recent national study entitled *Simulation and Computer-Based Technology for Education* sponsored by the U.S. Air Force and conducted by the University of Central Florida's Institute for Simulation and Training (Medin, 1995) identified several factors that hindered systemic educational reform resulting from existing technology integration efforts. These factors can be summarized as follows:

- a lack of training for school and district administrators aimed at familiarizing them with specific technology applications, as well as appropriate methodologies for integrating these technologies within the school/classroom;
- a lack of training for teachers that incorporates both hands-on use of specific technology applications and information concerning how best to integrate a given technology within the classroom setting;
- an inability or unwillingness to modify curricula to ensure that the application of technology supports the objectives set forth by the school and by the individual classroom teacher;
- a general absence of readily accessible information concerning all phases of the technology integration process, including planning, implementation, and evaluation;
- a lack of transfer between what students learn in the classroom and what is required for success in the workplace; and
- limited access to equipment and training for parents and communities.

Conceptual Framework

In order to better understand the issues and challenges involving technology integration, the authors have adopted a conceptual framework based on a general systems approach (see Weinberg, 1975). A systems approach can apply to a wide variety of areas because it separates the particular object of interest into three components: input, process, and output. Thus, a systems view of a school could result in the following three components: taking individuals with a need for knowledge (input), providing them with a variety of learning materials and instructional events (process), thereby producing individuals with sufficient knowledge and skills to contribute to their community through work and social activities (output). In addition, a micro-view of a school system would identify subsystems, such as individual classrooms, whereas a macro-view of the same school system would show that it is embedded in one or more broader systems (e.g., local community, school district, or state education system).

There are several characteristics of a system that make using a systems approach appealing for understanding the process of technology

integration. Systems are dynamic in nature, and if they are not maintained on a regular basis, they will break down. System components are interrelated, and, more often than not, the relationship is bi-directional. This characteristic is especially true of social systems. For example, just as the quality of graduates from a local school can have a noticeable impact on a community, the quality of incoming students from the community can have a noticeable impact on the school. Also, changes to a system can produce both intended and unintended consequences, and a change in one system component may affect another system component that has no direct connection to it. For example, a seemingly slight modification to a system input can produce dramatic changes in the system output. This latter characteristic is referred to as a "ripple effect" because it mimics an expanding set of concentric waves, such as when a rock is thrown into the calm waters of a pond. In terms of providing guidance when making needed changes to a system, it is not surprising that a systems approach would place a high priority on advanced planning, coordination of resources, open and honest communication/feedback, and strategic use of change agents within and, if necessary, among system components.

A recent report by the Department of Defense provides a clear example of the key obstacles surrounding the process of technology integration. The report also demonstrates the feasibility of using a systems approach for understanding the integration process. The report, published in 1996 by Science Applications International Corporation (SAIC) and sponsored by the Test, Systems Engineering and Evaluation Agency, chronicles a study whose purpose was to determine the effectiveness of using advanced technology applications in the area of modeling and simulation (M&S) for acquiring weapon systems. Among the major findings of the study was a description of the three primary obstacles to using M&S in the acquisition process: technology, organization, and culture. The report maintained that the latter two obstacles were more often a greater hindrance than the technology obstacle. For example, the report described a situation in which technological barriers were overcome, and a virtual wind tunnel M&S application was developed. Although the virtual wind tunnel was able to generate test data on missile performance, the number of live test flights used to evaluate the missile's performance was not reduced. Thus, it appeared that senior management was not ready to fully trust the data generated by the M&S application. In addition, the cost savings were not realized because the managers did not feel they could rely on virtual test flights.

It is interesting to note that these same three obstacles were reported by the Boeing Corporation when they implemented the use of advanced technology applications during the development of the Boeing 777 commercial airliner. Obstacles related to technology are often money driven because cutting-edge technology typically costs substantially more than technology applications that are a year or even several months old.

Organizational obstacles also have a monetary component, such as the cost of training personnel in the use of the new technology. Other important organizational obstacles relate to an organization's ability to provide a clear vision to its personnel concerning the expected benefits brought about by the use of the new technology and the leadership and advanced planning required to set the implementation process in motion.

Cultural obstacles relate to an organization's ability to foster successful implementation by supporting the use of and reliance on the new technology, by recognizing and rewarding those individuals/departments who take the time and effort to learn and apply the new technology, and by advocating open and honest communication. Open communication can be a real challenge because admitting performance problems is typically taboo within organizations. However, it is imperative that fast and accurate feedback be provided across all system components to ensure that any negative consequences are identified early so that adjustments can be made to the technology application or to the implementation process itself.

In summary, by applying a systems approach to the technology implementation process, we place a great deal of emphasis on organizational and cultural obstacles. Our experience has been that technology implementation for enhancing education necessarily overlaps several interrelated systems, including individual classrooms, schools, larger school-based organizations such as feeder systems and districts, and local community entities such as chambers of commerce and local libraries. This overlap should be viewed as a very positive characteristic because of the central role education has within all communities. In effect, we believe

education provides the impetus through which the concept of dual use becomes a viable and integral guiding force to achieving effective and efficient technology integration. The following section presents our vision of education and the central role dual use plays in this vision.

Educational Vision

Education must provide a way to include community members through the creation of an expanded community learning environment. This environment consists of two parts: the formal education system (e.g., K–12, colleges/universities, and Vo-Tech Centers) and an informal education system composed of a variety of organizations, agencies, and civic/social groups within the community (e.g., churches, hospitals, businesses, government agencies, civic organizations, libraries, and families). Based on this concept of an expanded learning environment, we define education as the life-long acquisition of knowledge, skills, and abilities that promote personal growth and fulfillment, economic viability (at both the individual and community level), and community enrichment.

An expanded learning community provides all of these benefits. In order to develop such communities, simultaneous and systemic changes must occur from two perspectives: the top-down (state/national) and bottom-up (community/school). Also, while the integration of emergent technologies is an important component of this process, it is equally important to firmly establish the necessary social/cultural support structures at the macro (state and national) and micro (community and school) levels prior to attempting technology integration activities.

In order to accomplish an effective technology integration effort, a three-phased approach was developed that is adaptable to a variety of communities and educational organizations.

Methodology

Phase I requires the establishment and involvement of an executive council made up of subject matter experts from each of the involved schools, community agencies, industries, and academia. This council establishes needed parameters (e.g., expectations and limitations) that guide the overall technology insertion effort in each school district and the surrounding community as a whole. Based on input from the council, a formal methodology is developed to ensure that a sound implementation plan is established for developing, researching, and applying appropriate emerging technologies to predefined problem areas. Although the implementation plan provides a baseline for guiding future efforts related to each project, the executive council may reconvene on a periodic basis to review and modify this plan. Plan revisions may result from data collected during the ongoing evaluation process or due to unforeseen technological innovations occurring after the original plan was drafted.

Once a robust technology integration and evaluation methodology has been established, the major emphasis shifts to applying the technology and resources in a cost-effective manner through dual-use functionality. That is, innovative technology-based solutions initially targeted to solve a specific problem within the school system (or community) are applied to other areas of need, and will improve the efficiency of a wide range of operations. For example, computer hardware and software at several middle schools in one community were targeted for use in the evenings by adults re-entering the workforce and by emergency service providers in the event of a natural disaster (e.g., a hurricane or tornado). By focusing on dual-use functionality throughout the planning and implementation stages of the technology integration process, the various community sectors can equitably share the costs and benefits associated with applying these technologies.

The outcome from Phase I will provide the school and community agents of change with a comprehensive methodology for planning and implementing successful technology integration. Key areas, such as training and curriculum modification, as well as critical program management issues such as determining cost factors and establishing effective procedures for evaluating program objectives are established before Phase II. To accomplish these goals, involvement of subject matter experts from community, industry, and academia is required. These experts help to ensure that technology resources applied within the school setting are used to the greatest extent possible to support and improve overall community resources.

Key tasks performed during Phase I include:

- conducting a front-end analysis to identify and clearly specify user requirements, including a detailed timeline of key activities and events;

- conducting a survey of current technology applications/systems being used by all of the partners;
- developing a technology plan for each community group that links the school system to available community resources;
- developing the overall technology integration plan that emphasizes dual use of technology resources and sharing of information;
- establishing network linkage between each of the participants;
- assessing Phase I outcomes and processes using a variety of evaluation tools (e.g., surveys, rating scales, and interviews) and documentation media, such as written reports, pictures, and video (these materials will be the basis for making adjustments and modifications during the Phase II effort);
- presenting the results of Phase I to the executive council with recommendations for Phase II.

Phase II consists of educating stakeholders, which include administrators, teachers, supervisors, technicians, parents, and the local community, concerning the methodology for achieving technology integration, as well as providing training to appropriate personnel related to specific technology applications. This phase is critical to the overall success of the program. Understanding the new (high-tech) environment and incorporating its various capabilities into the community's schools will require educators to break through old paradigms that could hinder change.

Key tasks that are performed during Phase II include:

- developing a matrix-specifying hardware and software functionality relative to user requirements to facilitate dual use of resources;
- developing life-cycle projections for all hardware and software components;
- conducting train-the-trainer workshops and associated take-away training materials for each participant group that emphasizes the process of incorporating technology into the various user environments;
- conducting community awareness seminars in conjunction with the local school board and developing and presenting a coherent technology integration vision to parents and community leaders;
- conducting technology application workshops directed toward users within the community to facilitate dual use of resources within the community at large;
- assessing Phase II outcomes and processes using a variety of evaluation tools (e.g., surveys, rating scales, and interviews) and documentation media, such as written reports, pictures, and video (these materials will be the basis for making adjustments and modifications during the Phase III effort);
- presenting results of Phase II to the executive council with recommendations for Phase III.

Phase III involves incorporating various technology applications within the school system and targeted local community organizations. Based on the rapidity of changes occurring within a given technology application, the technology integration process should be monitored and, if necessary, modified on a periodic basis. By implementing a continuous plan–review–revise process that monitors the overall integration effort, a long-term technology integration approach is created within the community. Sustainment of the approach is a critical aspect of Phase III and will be achieved by the continued involvement of all participant groups.

Application of Methodology within Five Different Communities

Currently there are five communities that have been going through this process for varying lengths of time over the past 3 years. Each of these communities represents a different aspect of our society. They also differ with respect to the designated change agent who is facilitating the process. Table 1 presents unique characteristics associated with each community, including the local change agent responsible for initiating the technology integration effort for the community.

A survey was conducted at the beginning of each technology integration initiative to determine the availability and use of technology applications within individual schools and selected community organizations. In some instances, a detailed paper-based survey was mailed to selected sites. For example, the Appendix presents a sample paper-based *Technology Assessment Survey* used to collect

Table 1

Examples of five diverse technology integration initiatives

Target Population	Areas of Technology Insertion	Local Change Agent
Farm Community Migrant Families Refugee Population Low Income Students K–12	Information Management Environmental Simulations Health Network / Simulations Community Connections	School District
Suburban Students K–12 Parents Senior Citizens	K–12 Technology Curriculum Research Technology Engines Emergency Management Community Connections	School Principals
Rural Mid America Students K–12 Town Citizens	K–12 Technology Curriculum Community Connections Distant Educational Resources	Town / School Leadership
Inner City Students at Risk K–12 Welfare to Work Senior Citizens	System Design Simulations Health Network / Simulations Community Connections	Program Teacher Town Leadership
Rural County Students 9–12 Community College Town Citizens	K–12 Technology Curriculum Community Connections Distant Educational & Resources	Local Business / County Leadership

technology application data in schools. In other instances, a more informal data-gathering technique was employed, such as interviewing key administrative personnel about the status of technology applications within their area of concern. Results of these surveys can be summarized as follows:

- The rural and farm community lacked the communication infrastructure to support an integrated technology approach.
- There is a higher percentage of new high-end equipment in the inner-city schools than in any other group.
- Community agencies operating in the suburban area have the most sophisticated communication backbone and equipment compared to agencies in other areas.
- Access to a personal computer is highest in the suburban area.
- Home-based personal computers in the suburbs are newer and higher end than in the schools.
- Within each of the school districts surveyed, the highest percentage of computers was located in the district office and lowest percentage was located in the middle schools.
- Libraries have some resources, but these vary and bear no relationship to community location.

Based on the results of these surveys, each community developed three to four areas of emphasis for their particular community technology integration project that would support the creation of an expanded learning community.

The community that has made the most progress with this approach is a small, urban community

located in Central Florida called Oviedo. The entry point for us into this community was the local school feeder system consisting of two elementary schools, a middle school, and a high school. The change agents responsible for initiating the technology integration process were the principals at each of the schools. During the 2-1/2 years working with the Oviedo school feeder system and the surrounding community, a number of milestones have been achieved. However, a key to the success of the technology integration initiative has been the willingness of the school principals to establish joint objectives and to conduct detailed status review of their technology resources.

The initial meetings were conducted at times during the day that would allow the principals, selected teachers, and community representatives to participate. During these meetings, it was stressed that a mid- and long-term vision of how technology could be applied to meet the administrative and educational goals should be developed as a basis for any decisions related to technology integration. Issues concerning the need to keep costs low and to provide a coherent progression of technology information and experiences for students were also discussed.

A number of initiatives resulted from these discussions, including a teacher-exchange program that allowed teachers from one school to visit another school within the feeder system to find out what computer hardware platforms are being used and what software programs are being employed. This program also facilitated a cross-fertilization of information and ideas that culminated in a plan to construct an integrated technology curriculum across grade levels. For example, it was pointed out that since a particular desktop publishing software program was being used in the high school to develop the school newspaper and yearbook, this same software should be incorporated at the middle schools to familiarize students with the software's basic capabilities. Also, based on the long-term goals that were identified at the beginning of the integration effort, it was decided that basic computer skills, such as keyboarding, should be taught in the elementary grades. This training would ensure that by the time students reached middle school, they would be ready to begin learning how to use more advanced computer applications, such as the one that is geared toward desktop publishing. In addition, the principals at the elementary schools were able to justify use of older computer equipment for teaching basic keyboarding skills, thus extending the life cycle of these machines.

It was interesting to note that teachers and principals were at least open to the idea of shifting some equipment between schools so that the high-end computers could be used for more advanced applications (e.g., ones that used heavy graphics or employed simulation) with the overall intent to upgrade lower-end computer hardware/software resources when newer, more advanced machines became available.

In terms of dual use of technology, the middle and elementary principals developed and implemented plans to allow the computers to be used for adult education classes held in the evenings at each of the schools. Meetings with local police and firefighter managers opened up the possibility of using these same computers as a backup system should a natural disaster occur. Later discussions with these same individuals also opened up the possibility of conducting a mock hurricane scenario to test out the best way to transfer information and command-and-control functionality to the schools should it become necessary. This cooperation also provided potential avenues for outside funding to obtain hardware and software to implement a network communication infrastructure within and between the schools in order to support the emergency management component.

Finally, at the school level, additional changes to the base curricula were implemented related to technology. For example, prior to the integration effort, the middle schools provided an optional one-semester course on basic technology applications. Starting this year, with the reallocation of resources, this course is now required for all grades and is two semesters in length.

The evaluation component being used to assess the progress of the various technology integration efforts within the five communities has proven to be a difficult challenge. The evaluation plan calls for collecting quantitative and qualitative information related to both program outcomes and processes. A variety of data collection tools are being employed, including surveys and interviews. Other relevant data, such as overall student achievement levels, are also being incorporated into the evaluation. To date, evaluation information is being collected and is incomplete.

Conclusion

Taking a systematic technology integration methodology from the military and applying it to communities to form an expanded learning environment has proven to be a cost-effective way to initiate technology integration. Key Phase I activities that make the methodology successful include early identification of available technology resources and working closely with change agents to assist them in developing a vision of how to use all the resources that are available within a given community. Resources can then be allocated in such a fashion that they can support the overall community needs and goals. Within Phase II activities, developing a technology education program for all stakeholders is very important. This program should include a train-the-trainer component so that critical information can be transported to the various participant groups in a timely manner. Through this technology integration methodology, an extended learning community can be created that provides a system for inclusion of all community members by maximizing the use of all available resources through dual use of those assets.

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APPENDIX

Sample Technology Assessment Survey

Technology Assessment Survey

Purpose: This survey is being conducted to assess the current state of computer technology implementation within K–12 schools throughout the Central Florida area. This information will benefit local schools as well as school districts by determining technology resources available at both the school and county levels. All names and responses will be treated confidentially; only trends will be expressed in the final report. The results of this survey will provide the county and its schools guidance on how to best implement these resources.

Directions: This survey is designed to be completed in 10-15 minutes. For items having multiple-choice responses, place a check mark in the appropriate space next to the selected response category(s) as directed. For open-ended items, write your response in the space provided. We recognize that responses to items requesting information on hardware/software availability/usage will be based on your knowledge and experience rather than a detailed inventory of equipment and resources.

I. BIOGRAPHICAL DATA

Your Name _____ **Today's Date** _____

School Name _____

County in which your school is located (circle): Lake Orange Osceola Seminole Volusia

Type of school (circle): High school Middle school Elementary school

Number of students attending your school _____ **Number of teachers in your school** _____

II. COMPUTER HARDWARE

1.) The number and type of computers available to teachers/students in your school are: (write number corresponding to each type)

Apple/Macintosh	IBM/clone	Other
1. ____ 030	5. ____ 286	9. ____ DEC
2. ____ 040	6. ____ 386	10. ____ Sun SPARC
3. ____ Power PC	7. ____ 486	11. ____ Silicone Graphics
4. ____ Apple II series	8. ____ Pentium	12. ____ Tandy
		13. ____ Wang

2.) Please indicate the location and total number of computer peripherals available in your school. (Write number in space provided under the "# of peripherals" column. Referring to the choices A-D below, place the corresponding letter under "location" column to indicate the location of the computer peripherals. You may have more than one letter next to each item.)

A. all classrooms B. certain classrooms (specify) C. media center D. library

Equipment	Location	Total #
1. CD-ROM drive (internal or external)	____	____
2. Laser Disc Player	____	____
3. LCD Panel (projects computer image onto large screen)	____	____
4. Digital Scanner (converts images or text into a digital format for further processing)	____	____
5. Dot Matrix printer	____	____
6. Laser printer	____	____
7. Inkjet type printer	____	____
8. Plotter printer	____	____
9. Other (specify)_____	____	____

III. COMPUTER SOFTWARE

3.) The computer software applications used by students in your school include: (check all that apply)

[ ] 1. Computer programming languages (FORTRAN, Pascal, C, C++, etc.)
[ ] 2. Graphics (Powerpoint, CorelDraw, etc.)
[ ] 3. Drill & practice
[ ] 4. Learning games/simulations (SIMCITY, Carmen SanDiego, etc.)
[ ] 5. Word processing
[ ] 6. Spreadsheets
[ ] 7. Authoring systems
[ ] 8. Other (specify)_____

4.) Check the following areas where students are using computers. (check all that apply)

[ ] 1. Programming
[ ] 2. English
[ ] 3. Foreign Language
[ ] 4. Library Science
[ ] 5. Math
[ ] 6. Music/Art
[ ] 7. Science
[ ] 8. Social Studies
[ ] 9. Typing/Keyboard
[ ] 10. Other (specify)_____

IV. INTERNET/World Wide Web (WWW) CONNECTIVITY

5.) Does your school have Internet/WWW connectivity/access?
(check one) 1. ____ yes 2. ____ no

(If "no", please continue to section V.)

6.) In your school, the following individuals have access to the Internet: (check all that apply)

[ ] 1. Administrators/staff

[ ] 2. All teachers
[ ] 3. Certain teachers
[ ] 4. All students
[ ] 5. Certain students

7.) If drill & practice software is used in your school, in what content areas are they being utilized? (check all that apply)

[ ] 1. Reading
[ ] 2. Spelling
[ ] 3. Math
[ ] 4. Foreign language
[ ] 5. Science
[ ] 6. Geography
[ ] 7. History
[ ] 8. Other (specify)_____

8.) Are teachers utilizing computers for classroom administration? (check one) 1.____ yes 2.____ no

If yes, what classroom administrative functions are being tracked? (check all that apply)

[ ] 1. Class assignments
[ ] 2. Student attendance
[ ] 3. Grades
[ ] 4. Calendar events
[ ] 5. E-mail
[ ] 6. Other (specify)_____

9.) If your school has Internet connectivity/access, how is it accomplished? (check all that apply)

[ ] 1. Telephone/modem
[ ] 2. Fiberoptic line
[ ] 3. Radio packet repeater
[ ] 4. Dedicated T-1
[ ] 5. Other (specify)_____

10.) If students have Internet access, how often does the average student use the Internet? (check one)

[ ] 1. Daily
[ ] 2. 2 - 4 times a week
[ ] 3. 3 - 8 times a month
[ ] 4. 1 - 2 times a month

V. PERCEIVED BENEFITS

11.) In your opinion, what percentage of teachers in your school perceive the use of computer technology as being: (please fill in a percent for each response category - total should equal 100%)

_____% Highly beneficial for improving student learning outcomes
_____% Moderately beneficial for improving student learning outcomes
_____% Having no noticeable benefit, but having no negative impact either
_____% Having a slight negative impact (e.g., minor disruption, too complicated, etc.)
_____% Having a moderate to high negative impact (e.g., major disruption, etc.)

VI. TRAINING

12.) How does your school determine what training courses are offered to teachers in the area of computer technology? (check all that apply)

____ 1. Informally (e.g., based on what other schools are doing, informal requests, etc.)
____ 2. Use surveys/questionnaires
____ 3. Ask for input during staff meetings
____ 4. Other (specify) _____

13.) On average, how many hours per year do teachers in your school spend attending inservice training related to the use of computer hardware/ software, Internet, multimedia, etc. (fill in value)?

_____
(avg. training hours spent per year)

VII. TECHNOLOGY PLANNING

14.) Does your school have a technology integration plan? (check one)

____ 1. yes ____ 2. no

If possible, please send or fax a copy of your school's integration plan. If this is not feasible, please attach a summary or an outline of the plan.
FAX (407) 658-5059

15.) Using the scale below, rate how computer technology in your school has <u>positively</u> impacted the following areas: (place rating next to item)

Greatly Impacted	Moderately Impacted	Little or No Impact
3	2	1

____ 1. Overall student grades
____ 2. Overall student attendance
____ 3. Overall student behavior
____ 4. Overall drop out rate
____ 5. Overall teaching techniques

16.) In your school, <u>rank order</u> the relative importance of the following 4 types of computer literacy training for teachers (place "1" next to the most important training type, a "2" next to the second most important type, etc. Please use all 5 ranking values).

____ 1. In-service training
____ 2. Co-worker tutoring
____ 3. Self-taught (e.g., read manual, use tutorial)
____ 4. Student tutoring
____ 5. Private commercial training

If you answered yes to #17, what is the time frame for the plan? (check all that apply)

_____ 1. Short term 1-2 years
_____ 2. Long term 3-5+ years
_____ 3. Other (specify) _____

The Internet as an Instructional Tool in Family Literacy Programs

Susan Imel & Judy Wagner ■

Abstract

This edited transcription of a presentation by Susan Imel and Judy Wagner, from the ERIC Clearinghouse on Adult, Career, and Vocational Education, discusses the use of the Internet in adult education and family literacy programs. Issues discussed include models of technology instruction, adult learning characteristics, and World Wide Web sites of potential interest for adult education.

■

Introduction

We very much wanted to be a part of this conference, but we had to think about it because the areas that the conference covers are not exactly the areas that our Clearinghouse—the ERIC Clearinghouse on Adult, Career, and Vocational Education—covers, or that we personally worked with. We decided to put together a presentation that discusses how family literacy programs are using the Internet. However, because we could not get a lot of information from family literacy programs or through the usual sources about how family literacy programs are using the Internet, we broadened it to include information about literacy programs in general and how they are using the Internet. I would also like to say that we are looking at this in terms of family literacy from the adult participant, because we cover the field of adult education, and in family literacy programs, sometimes there are programs or segments of family literacy programs that focus on the adults and generally that's the mothers.

I'd like to tell you just a little bit about what we're going to do and then see if perhaps you have questions or concerns that you think may not be addressed. The first thing that we're going to do is spend some time talking about technology, in particular models of instruction in terms of technology, and also describe some characteristics of adult learning. Then we're going to launch off into some of the specific examples of Internet use that we've collected that illustrate how family literacy programs are using the Internet, and then we are going to give you some examples of how adult literacy and basic education programs are using the Internet. We compiled a list of Web sites that have been reviewed (Appendix A), and we also have some specific lessons related to the use of the Internet. Again, it may be of some use to you if you are particularly interested in using the Internet as an instructional source. Finally, we're going to talk about how and why the Internet can be used effectively.

Models of Technology Instruction

In thinking about using the Internet as an instructional tool, I think it's good to review some of the integration models of how technology can be used, some of which Mike Eisenberg touched on in his presentation. The first model of technology use is when technology actually is the curriculum, when you use technology as the focus—for example, if you are teaching word processing or spreadsheets or any of the common software tools. One of the drawbacks to this model, which Mike also mentioned in his presentation, is that frequently this kind of curriculum model or this kind of use of technology in instruction does not give a context for the learners. They are just learning the application without necessarily learning how it's used. I think about myself and how I first learned word processing. I never took a word-processing course specific to a package until I had actually done some

work with word processing so I knew what I wanted to do with it.

Another model that is used in adult literacy is when the technology is used simply as the delivery mechanism. I did some work several years ago in workplace literacy, and it was very common to get advertisements or have vendors contact us who wanted us to buy their program. They're called individual learning systems, and everything is in the system that the learner needs. It's very skill-specific. Learners work individually, and they really are just using the technology to learn a discrete set of skills, such as mathematics or reading. The Pal System is one that I know of that was quite popular in the late 1980s and early 1990s for workplace literacy programs. For some reason, a lot of the companies had developed these learning systems that they wanted literacy programs to buy, probably because they thought that the workplace literacy programs had money. One of the many drawbacks to these systems is that they're really expensive. Some of the other drawbacks again are similar to the curriculum model's—they do not necessarily teach skills in context.

A third model is where technology is used to complement instruction so that a program may use software packages that the learners use in conjunction with more traditional instruction. I'm sure you're familiar with this model. In fact, it's quite common now in adult literacy and basic education programs because many programs have computers and have been able to purchase software. But still, it's not integrated into the instruction.

The last integration model is when technology actually becomes an instructional tool, where the technology is really invisible. It's like using a chalkboard. We never even thought about it as a tool; it was just something there that supported instruction. The Internet in many ways is really an ideal tool if it's used appropriately because it can support instruction and there's many things that it can do—word processing or desktop publishing or spreadsheets. For example, your class might be doing a newspaper or a newsletter, and they would learn desktop publishing. They might do a writing assignment, and they would use word-processing software. They might be doing mathematics, and so they would be using spreadsheets. Rather than having software be the focus of the instruction, it supports the instruction. One of the ideal uses of the Internet is that it can support the instruction.

One of the drawbacks to the Internet is the expense. In fact, someone that I was sitting with at lunch said that she's working in a early childhood family literacy program, and one of the problems is there is not money to purchase computers. I think one of the drawbacks is that computers still in many locations are not affordable, which limits the access to the use of technology.

Adult Learning Characteristics

I'd like to talk just a little bit about some of the adult learning characteristics that make the Internet a particularly appropriate tool. When we talk about adult education for adult learners, we frequently begin by talking about the fact that adults are self-directed. This characteristic was popularized by a man named Malcolm Knowles. Also when we talk about working with adult learners, we talk about the need to be learner centered, to be centered on and focused on their needs.

Another characteristic of adult learners is that adults, generally, are very problem focused in their learning. They have a specific goal; they have come for a reason. Adults also are very interested in interactive kinds of learning and engaging in problem solving. Finally, it's very important for what adults are learning to be contextualized, for them to understand what the transfer is between what they're learning and how they can use it.

Just yesterday after we got here, I was looking at a newsletter that I got in my mail earlier in the week, *Focus on Basics*. It's put out by the National Center on Adult Learning and Literacy that's located at Harvard. They're a relatively new center (URL: http://hugse1.harvard.edu/~ncsall/). There was a very interesting article in the newsletter titled "Technology Melts the Classroom Walls." The author, Susan Cowles, an educator from California, was describing how the Internet helped her with a multilevel class. In fact, this whole issue is on working with adult multilevel classes.

I thought her explanation for why she liked using the Internet fit very well with these characteristics of adult learning. She said that she had three observations. The first is that she believes that any skill is learned best when embedded in content, especially when that content is of interest to the learner and has meaning in the context of the learner's life. Second, she believes that learning occurs when it is active and not passive—so there is the interactive group problem solving. Third, it

has been her experience that technology broadens the opportunity for teaching in context and for learning in an active way. She actually began this article by talking about three questions that people in her class proposed, and how they found the answers to these questions through the Internet.

Web Sites

In preparation for this presentation, we put an announcement on a listserv that is run by the National Institute for Literacy. They moderate several different literacy listservs; for example, the Workplace Forum, the Family Forum, the ESL Literacy Forum, the Learning Disabilities (LD) Forum, the Homeless Forum, the Health Forum, the Technology Forum, and the National Literacy Advocacy Forum. We contacted two listservs—one that discussed technology and one that discussed family literacy. (These are very good listservs, and if you have questions, there are wonderful discussions, and the people on them are very helpful and friendly.) We posted an announcement and explained that we were going to be making a presentation at this conference and asked people to tell us what they were doing with the Internet. "Are you using the Internet under family literacy programs? If so, what are you doing?" We did this sometime this summer, and we got absolutely nothing—no response. We finally decided that maybe it was the timing—maybe midsummer is not the time to ask these questions. So sometime in the middle of September, we thought, "Aha! The time is right." We posted practically the same message again—first, alerting people to the fact that this conference was being held and, second, to our desperate need for information about what they were doing with technology in their programs. Appendix B contains some examples of what we heard from people.

We looked through some of these responses and found them very interesting. One of our favorites was the Families and Their Work Web site (http://www.otan.dni.us/webfarm/emailproject/family.htm). When you visit this Web site, what you get are pictures that children have drawn as part of their program. It's just a fascinating and very interesting site about parents and children working together. We strongly recommend that you go in and look at this site.

In addition to posting to the listservs, we did a Web search on family literacy to locate some Web sites, which are listed in Appendix A. Some of these were ones that people had recommended to us, but we also did our own search. As Mike Eisenberg said, you put in "family literacy," and you get 4,327 or some ridiculous number of hits, but you could never look at all of them. We pulled up a few and tried to get ones that we knew were good and then others that were good representations of some of the Web sites that are available.

Judy and I actually had different experiences searching the Internet. Judy has been to a course. (She's an expert on searching the Internet.) I have not been to a course on searching the Internet, and when I searched, I did not search using family literacy. When we were thinking about doing this presentation, I was desperate to find information on how adult educators or adult basic and literacy educators are using the Internet, so in addition to searching ERIC, I did a Web search. One of the most interesting things that I turned up was the Adult Education Teacher's Annotated Webliography (http://www2.wgbh.org/MBCWEIS/LTC/ALRI/webliography.html). I am not sure what terms I used, but I think I used adult literacy and the Internet.

I would like to point out a few of the sites that I think would be particularly useful for family literacy programs. This is an example to me of what Michael Eisenberg was talking about in his presentation when he said you go in and you get a thousand hits or a hundred hits or fifty hits, and you're not exactly sure which one we should look at. The Webliography happens to be a list of sites that have been reviewed by adult literacy and basic education teachers. One of our favorites is called Collected Visions (http://cvisions.nyu.edu), and in some ways, I think it's similar to the Intergenerational Cultural Traditions Web site (http://www.otan.dni.us/webfarm/emailproject/cul.htm). The Collected Visions Web site is a collection of photographs. This would be a wonderful site to use in a family literacy program because it took families working together to create it. In addition to looking at the photographs that are on the site, people can actually submit their own photographs.

Another site that I thought had good application was the Family Math home page (http://theory.lcs.mit.edu/~emjordan/famMath.html), where you can subscribe to a newsletter or a listserv. Sites related to health include Community Outreach Health Information System at http://web.bu.edu/COHIS/ and Health-Links at http://phoenix.mcet.edu/

healthlinks. The last site that I picked out was The Email Project at http://www.otan.dni.us/webfarm/emailproject/email.htm.

I have a true confession to make. I had not thought too much about how the Internet could be used as an instructional tool in adult literacy and basic education or family literacy until we were getting ready to do this presentation. But now that I have thought about it and realized some of the applications, I really am tremendously excited about what can be done with it because I think it can support all of the best kinds of features of adult learning. For example, on The Email Project home page, there is a link to an Annotated Book Lists page that talks about family literacy programs. The goal is to have parents list books that they have enjoyed reading to or with their children so that others could benefit. This would be a place if you were interested in finding books, or you could have the people that were in your program actually go in and put their books on it.

The other thing that I found when I did my search was the Web-Based Lesson Plans site (http://www2.wgbh.org/mbcweis/ltc/alri/lessonplans.html), a companion resource to the Adult Education Teacher's Annotated Webliography. None of the plans is particularly related to family literacy, but most of them could be adapted or used in family literacy programs.

One that I was particularly interested in was the women's history Internet lesson. During the last year, one of my other ERIC colleagues, Sandra Kerka, and I did a lot of work with women and literacy. I was thinking this would really be a neat kind of project to do with mothers and daughters on women's history; that they could do it together. The drawback to this one is that it requires quite a few resources because it suggests using four computers—one with Internet access, one with the *Grolier Encyclopedia*, one with the *Webster's Encyclopedia*, and one with *Her Heritage*. But if you didn't have all of that software, you could use print resources to supplement what you were doing over the Internet.

Conclusion

One of the few printed items that I could find about how people are using the Internet in adult literacy and basic education is *Using the Internet in the Adult Basic Education Classroom: Learning Together through Experience*, by Margarete Epstein. This piece is published by the Ohio Literacy Resource Center and is also available on their Web site at http://archon.educ.kent.edu/Oasis/Pubs/0500-3.html. The Ohio Literacy Resource Center is the midwest regional technology hub for the National Institute for Literacy. They're organizing these technology hubs all over the country, and they have funded some programs in Internet use. This publication lists some of the goals for Internet use that I think are particularly applicable. It points out that the Internet expands the resources for the classroom, and also that you can use it for e-mail, listservs, and news groups. When we think about using the Internet only to go into those Web sites to get all of that wonderful information, we overlook some of the other attributes of Internet use. It improves computer literacy skills, provides very positive learning experiences, and reinforces and makes use of all of those characteristics of adult learning that I talked about earlier.

One of the other goals for the Internet use discussed in this publication is that it provide a vehicle for sharing program success, which is what we tried to do in preparing for this presentation. We tried to collect information from programs so that they had an opportunity to tell us what they were doing. I would just suggest that if you are interested in what happens when the Internet is used in adult literacy, this is a great piece.

APPENDIX A

Family Literacy/Technology Web Sites and Listservs

ERIC Clearinghouse on Adult, Career, and Vocational Education
http://ericacve.org

National Institute for Literacy
http://novel.nifl.gov
Technology Listerv:
nifl-technology@literacy.nifl.gov
Family Literacy Listserv:
nifl-family@literacy.nifl.gov

National Center for Family Literacy
http://www.famlit.org

Literacy Volunteers of America
http://www.songline.com/lva

Initiatives for Children
http://www.neosoft.com/~ifc/links/literacy.html

Media Literacy Online Project
http://interact.uroegon.edu/mediaLit/HomePage

Ohio Literacy Resource Center
http://archon.educ.kent.edu/Oasis/index.html

Family Literacy Center
http://www.indiana.edu/~eric_rec/fl/menu.html

The Barbara Bush Foundation
http://www.bushfoundation.com

Massachusetts Department of Education
http://info.doe.mass.edu/welcome/family.html

OTAN (Outreach and Technical Assistance Network)
http://www.otan.dni.us

Adult Education Teacher's Annotated Webliography
http://www2.wgbh.org/MBCWEIS/LTC/ALRI/webliography.html

APPENDIX B

Listserv Responses

In preparation for this program, a message was sent to several listservs that relate to family literacy. We asked people to tell us how they are using the Internet and the World Wide Web in their programs. Following are some of the responses:

- In one program, computer technology is being used in Even Start and ABE classes. Adult students have access to the Internet from their classroom and participate in worldwide classroom projects. A Web page for the Even Start Program is being developed. Teleconferencing to broadcast Spanish GED classes is being planned.
- In a Texas school district family literacy program, parents can take computer literacy classes on their child's classes. They can attend the classes before or in between their ABE or parenting classes. Because they use the same computers, classrooms, and personnel for both children and parents, there is a cost saving.
- *Families and Their Work* is a Web page of the Santa Ana College's family literacy Web project (http://www.otan.dni.us/webfarm/emailproject/family.htm). It includes pictures drawn by children accompanied by stories of family customs.
- The Family Success program in Centralia, Illinois, uses a Center of Excellence lab for families enrolled in ESL classes. The families make books and do techno-scavenger hunts among other projects. Programs are provided in 10 locations throughout the college district.
- Literacy Volunteers, with the support of the GTE Foundation, created a model to bring computer technology and computer-assisted instruction into LVA family literacy programs. The model involves the use of technology with parents, children, and families as well as the use of technology to support the Family Learning Center.

■

Families, Equity, and Technology:
"The 81 Percent Solution" Revisited

Ken Komoski ■

Abstract

Because students spend only 19% of their time each year in school, families and schools need to jointly focus on "the 81% solution" to improve learning beyond the school day and year. This paper discusses examples of the 81% solution that are being implemented in a variety of communities by the LINCT Coalition, a nationwide coalition of socially concerned, nonprofit organizations working together to help communities to achieve universal access to electronic information and learning via community networks and the Internet. LINCT's goal is the achievement of electronic equity at the community level by enabling even the poorest members of a community to "learn and earn" home computers via "electronic sweat equity." Communities are finding that this process is helping to strengthen in-school and at-home learning for students and job-ready computer skills for adults.

■

Introduction

My name is Ken Komoski, and what I want to share with you today is an update on what has been going on with families, learning, and technology in some communities as a result of ideas I put together 4 years ago in a "Commentary" piece published in *Education Week* (Komoski, 1994). I called the piece "The 81 Percent Solution—Restructuring Our Schools and Communities for Lifelong Learning."

I arrived at the "81%" idea after some conversations with a colleague and a few calculations, plus perusal of what others have concluded about the percentage of time—in the course of a year—that the average K–12 student spends in school-related learning. The most generous interpretation of these conclusions was this: each year, the average school-ager spends about 19% of his or her waking hours being exposed to school-related learning opportunities. (Had I taken the 9% conclusion reported by former Assistant Secretary of Education "Checker" Finn regarding learners in school Title I programs, we would be talking about "the 91% solution.")

The point of my little time study was simply this: if we are concerned about the development of lifelong learners as a goal of educational reform, we might want to pay attention to how and what learners are learning during their out-of-school time. This period is the proving time for developing lifelong learning skills—especially for youngsters in poor communities. In poor communities, in particular, we need to have affordable and rewardable ways of engaging school-agers in purposeful, voluntary learning beyond school time. They need to be engaged in incentive-driven, cooperative work with other learners that results in two learning outcomes:

- skills and knowledge that will improve their school performance and
- the ability to perform well outside of school on skills that are critically important to their lifelong ability to continuously earn a living in a change-driven economy.

In 1994, these challenging thoughts prompted me to say that educational reform was likely doomed as long as the reformers kept focusing on improving schools without focusing also on ways of improving student learning outside of the limiting nature of in-school time. This vision may seem unrealizable, but I believe that every educator worthy of the name recognizes its validity.

My goal here is to provide you with information about how some communities are working toward achieving such a vision. In the process, perhaps it may stimulate some of you to work on achieving this vision in your own communities. I also want to suggest how communities can help one another to increase the probability that this vision will become a reality in as many communities as possible, as soon as possible. But let's start with the reality addressed in "The 81 Percent Solution."

Lifelong Learning

Everyday, all children—rich, poor, and otherwise—constantly learn many things from many sources other than school. They can't avoid it. They are constantly sponging up and processing sights, sounds, events, experiences, and feelings. While some of this sponging-up process happens in school, many more emotionally formative parts of this learning go on at home: from family and other adults, some of whom are physically present, but many of whom appear on, or are responsible for, the television programs and commercials that students spend more time watching (a well-documented 25%) than the 19% of time spent in school. In those cases where students are living in "computer-have" households, many trade off some television "learning" time for time spent with a home computer.

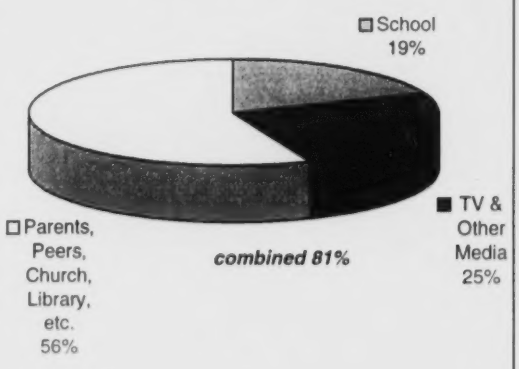
As any parent knows all too well, their children spend a good deal of time learning from and with peers, as well as from people, events, and resources in their communities: from libraries and museums to drug dealers and acts of violence. Unfortunately, for some children—whether poor, rich, or in between—home is a place where the latter two "learning opportunities" are all too available.

In other words, all learners live within, share in, and are parts of a complex "learning ecology" (Cremin, 1976; Niebuhr, 1984) of which K–12 schooling is only one part. And as K–12 students, in particular, seem to be so open for learning, how can we best ensure that they are building learning habits that will serve them, their families, and their communities well over time?

This is an important question. It's one to which schools pay too little attention. Why? Just ask any teacher: "It's because we just don't have the time."

But students do have the time. They have at least 81% of their time during which they are forming habits that will affect their lifelong attitude toward learning. If they associate learning solely with schooling, they will develop an attitude that is both limited and limiting—especially in a world in which more and more people are having to learn and then re-learn a living every few years. However, if they come to associate learning with self-development, self-esteem, and personal and family stability, both economically and socially, their attitude and the path and promise of their lives will have become quite different. They will become lifelong learners.

Student Time by Influences within the Overall Learning Ecology



Task: Optimize the Learning Ecology (The 81% Solution*)

* The 81 Percent Solution: Restructuring Our Schools and Communities for Lifelong Learning
P. Kenneth Komoski, Education Week, January 26, 1994

Now the very fact that you are where you are right now, doing what you are doing, is a clear indicator that you are a lifelong learner. As you acknowledge this fact, I want you to consider the extent to which the time you spent in school made you a lifelong learner. In addition to schooling, for most of us, our home life and other influences such as a public library, a particular book, a museum, perhaps media experiences, plus other out-of-school experiences with particular persons, even peers, were all parts of the learning ecology that helped shape us.

School-age children living in households that are at or below poverty level, in a "have-not" community,

tend to have far fewer positive out-of-school learning experiences. Their total learning ecology is often more toxic than their physical environment—filled with far more negative learning experiences than the ecology of more privileged peers. Even their schools produce less positive learning experiences, if only because of their less-than-adequately funded learning resources. Ironically, the one equally funded "learning" resource they share with their more privileged peers is their daily at-home immersion in television programming. And depending on at-home viewing rules, the learning they are experiencing ranges from developmentally enhancing and "cool" to tepid and toxic. Much of this learning comes from commercial messages geared to convincing "haves" that they need to have more than they already have. Exactly what these "shared" learning experiences impart to poverty-level learners is an interesting question. So today, more than ever before, a large part of the home life and community environment of the young learner is filled with largely self-selected, peer-influenced at-home television and other mediated "learning."

School–Community Networking

Having made these points in "The 81 Percent Solution," I provided examples of how through at-home access to Internet-based, school–community networking in one community I had visited, learners in "computer-have" families were able to access useful at-home learning resources via a community network, and that some were engaging in cooperative online learning experiences with peers. I pointed out that for these learners, these experiences amounted to a self-selected reduction of their also self-selected television and other media-spent time. In this community, I had discovered that at selected grades, children from poverty-level, "computer-have-not" families were being provided "loaner computers" by their schools, so that they might use the community network for learning, and their parents might use it for information and communication.

I suggested that the goal, not just for this community but for all other communities as well, ought to be to enable families living in or close to the poverty line to acquire used computers donated by businesses and government agencies—having recently read in the *Wall Street Journal* that in the previous year (1993) approximately 15 million used business computers were retired. There were clearly enough used computers coming out of businesses (plus government and private homes) to enable communities to move beyond providing "loaner-computers" at a few grade levels to enabling all of a community's "have-not" families to become computer owners. Here was a way to "level the learning field" between a community's "computer haves" and "have-nots." To encourage donations, I suggested that Washington provide special tax write-offs to businesses that donated used computers to community-based efforts of the sort I was describing.

But as important as getting donated computers was to carrying out this vision, it was more important to envision a way to use the used computers as incentives to motivate students and members of their family to commit to doing the hard work involved in learning how to make effective use of these computers in their homes. Shortly after publication of "The 81 Percent Solution," two colleagues and I came up with some further ideas about how to accomplish this goal. To put these ideas into action, we formed a coalition of nonprofit organizations with expertise in community and family development, education, and technology.

The LINCT Coalition

The Coalition (Learning and Information Networking for Community via Telecomputing—LINCT) has the singular mission of helping interested communities to enable "computer-have-not" families to "learn and earn" home computers in two ways: via community-managed after-school, learn-and-earn, peer-computer-tutoring work for children and via welfare-to-work, learn-and-earn computer training for parents and other adults (Komoski & Priest,1996).

What children and adults are actually earning are Time Dollars, a tax-exempt community-managed currency pioneered by one of the Coalition's co-founders, Dr. Edgar Cahn of the Time Dollar Institute in Washington, DC. Another co-founder, Dr. Curtiss Priest of the Center for Information, Technology and Society, has brought expertise in community networking as a means of facilitating home–school networking, and for managing the community-wide use of Time Dollars as a local electronic system for recording and rewarding all types of community volunteer work. Other member organizations have brought complementary expertise. My own organization, the Educational Products Information Exchange, education's most comprehensive source of information on electronic learning

resources, focuses on identifying those computer learning resources that will be most helpful for the children and adults who are learning and earning home computers in the communities that are being helped by the Coalition.

Community Experiences

So, 4 years after publication of "The 81 Percent Solution," I can report that some progress is being made in helping communities to make this vision a reality. I wish I could say that there are hundreds of communities in which the vision is a fully functioning reality. But although I can't say that, what I can report is that the vision is being turned into reality in at least a few communities in the East, one in the Midwest, and two in the West.

The first of these was my home community in rural Eastern Long Island, New York, where by working with both school–community collaboratives and the county departments of labor and social services, the LINCT Coalition has established volunteer, Time-Dollar-driven computer training programs that have been enabling poverty-level parents to learn and earn home computers and networking access, plus child care and other needed services. They are doing these things while fulfilling their 20-hour-per week workfare requirements. These efforts are being supported in part by a grant to the Coalition from the local county legislature and from the Civic Network Program of the Corporation for Public Broadcasting (CPB).

With the help of this CPB support, Web-based community network software is being developed to facilitate home–school communications and the community-wide record keeping of Time-Dollar work. This network software has the unique feature of enabling parents, students, and other network users to input to the community network's Web site either by computer or directly by phone using interactive-voice response (IVR) telephony.

The Coalition has recently gained the cooperation of five additional Long Island school–community collaboratives in implementing a more specifically family-focused strategy of learning and earning home computers and network access. Through this strategy, a parent (usually a single mother) works at learning and earning a family computer while her children are in school or in day care. Later in the day, her school-age children contribute to the family's learning and earning effort by participating in after-school peer tutoring.

The student peer-tutoring part of this strategy is building on the success of an earlier Coalition-designed after-school tutoring strategy in Chicago that began in early 1996. This strategic intervention into the learning ecology of a very poor community is being implemented by parents and students with the assistance of the Time Dollar Institute and funding from the Chicago Public Schools, with additional support from the Coalition's CPB grant. Since the start of this after-school tutoring strategy in Chicago, over 1,000 children from have-not households have learned and earned home computers, and the number of schools participating in the program has doubled.

As the community's Internet/Web-based learning and information networking becomes accessible to more and more learn-and-earn families in Coalition-affiliated communities, we expect to have students continuing their tutoring relationships online. We see this development as a further enhancement of a community's learning ecology, providing students a productive at-home learning alternative to time spent watching television. As an incentive for spending at-home time on learning that is directly related to improved in-school performance, both tutors and tutees continue earning Time Dollars. With these "dollars," they may purchase computer upgrades, faster modems, plus noncomputer "perks" such as donated tickets to professional ball games, "cool" items of clothing, and other Time-Dollar "perks" donated by local merchants. Students who become adept at Web skills may also earn Time Dollars by helping to create and maintain Web pages for their schools and other local organizations. In addition, computer-savvy students and adults are earning Time Dollars helping with a community's maintenance and repair of used business computers being donated for use in Coalition-affiliated communities by a growing nationwide network of businesses coordinated by the LINCT Coalition.

In early 1997, the Coalition began assisting two school–community collaboratives in poor, predominately Hispanic sections of Phoenix and Denver. In Phoenix, both the adult and student strategies of the Coalition's learn-and-earn computer training strategy have been implemented. In Denver, these strategies are still being introduced. In these two western communities, the Coalition's assistance is being supported in part by the federally funded Pacific/Southwest Regional

Education Technology Consortium (P/SW*RETC), plus the Coalition's CPB grant. In Phoenix, as on Long Island, the earning of Time Dollars is being extended beyond computer learning and earning to a broad range of community service jobs.

Conclusion

In all of the above implementations of the LINCT Coalition's strategy, the goal is to help communities to enhance the local learning ecology in ways that enable "have-not" families to become "computer-haves" through the learn-and-earn process. These communities are finding that this process is not only helping to strengthen in-school and at-home learning for students and job-ready computer skills for adults, it is also strengthening an important connection that many students and adults who become involved in the process had never quite made: "when I learn, I can also earn." Other important by-products are increased student, parent, and family self-esteem. For adults, we have found that this increased self-esteem often leads to the confidence to become a mentor for others. In a sense, we are seeing the peer-tutoring strategy transferring to the Coalition's adult computer training efforts. Many who have learned and earned their family computer are volunteering to help train their neighbors.

This "adults-mentoring-adults" by-product of the LINCT community-assistance strategy has recently led to a next step in the evolution of that strategy. This development is one through which the LINCT Coalition is generalizing the process of student peer tutoring and adult-to-adult mentoring to a process of community-to-community mentoring. This process will be a major thrust of the Coalition's activities throughout 1998. By means of this development, the community volunteers who have been responsible for the success of the LINCT strategy on Long Island will help the Coalition to mentor community members in Harlem and the Bronx. Community volunteers in Phoenix will help with the mentoring of their sister Hispanic community in Denver. In this manner, we intend to make it possible for the Coalition's strategy to become nationally scalable and self-sustaining from community to community. If your community is interested in becoming part of this effort, information is available on the LINCT Coalition Web site (*www.linct.org*). We welcome your participation.

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■

AskERIC Responds to Parents' Information Needs Using Technology

Ron Banks & Anne S. Robertson ■

Abstract

Parenting during the final years of the 20th century has been a demanding, complex, yet intrinsically rewarding job. In previous generations when parents had a parenting question or concern, they might ask an experienced grandparent, aunt, or respected neighbor. However, the transient nature of our society, the changing roles of men and women, and the growing base of knowledge about child development have led parents to look for additional types of resources and support systems. As we move into the 21st century, more parents, and professionals who work with parents, are turning to new technologies to assist them in finding parenting information and support. The Parents AskERIC service uses new technology to meet contemporary parenting education needs. PARENTS AskERIC began in 1993 as an extension of the AskERIC service, which is provided by the ERIC system and administered by the ERIC Clearinghouse on Information and Technology. Parents AskERIC responds to questions from parents and professionals who work with parents by providing access to relevant research and current literature on parenting questions and concerns. The service also provides referrals to current Internet sites and, when appropriate, links parents to relevant organizations or resources within their community. Requests through the Parents AskERIC service have grown by more than 25% during 1997 and continue to increase steadily. As more people become familiar with and have access to the Internet and computer-based services such as Parents AskERIC, the use of this type of technological approach will likely continue to grow. This paper provides an overview of the Parents AskERIC service and also looks at what kind of assistance is appropriate, and what kind of assistance is not appropriate, to provide to parents through the Internet.

■

Introduction

There are many ways in which parents can obtain information that is helpful to them in raising their children. They can talk to respected authorities such as pediatricians and teachers, engage in informal conversations with friends and relatives, read books and magazines, and view relevant media productions on television or video. With the explosion of information on the Internet and the availability of electronic mail (e-mail) to increasing numbers of parents, receiving parenting information through the Internet has become possible for many parents. This paper discusses the provision of electronic reference and information services to parents through Parents AskERIC, which is a cooperative effort of components of the Educational Resources Information Center (ERIC) system and the National Parent Information Network (NPIN).

NPIN began in 1993 with the Parents AskERIC service and a Gopher site intended to provide parents and professionals who work with parents access to high-quality, research-based materials written for parents. Currently, two ERIC clearinghouses share the NPIN project, the ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE) and the ERIC Clearinghouse on Urban Education (ERIC/CUE).

Overview of the ERIC System

Mission

According to the most recent *ERIC Annual Report*, the mission of ERIC is as follows:

> The mission of the ERIC system is to improve American education by increasing and facilitating the use of educational research and information on practice in the activities of learning, teaching, educational decision making, and research, wherever and whenever these activities take place (Smarte, 1997).

Essentially, the goal is to provide ready access to education-related literature and resources to a wide variety of user groups—from teachers and administrators to college students, faculty, and parents. The expectation is that access to this literature will help to improve the quality of a broad spectrum of education-related services, including early intervention birth-to-3, preschool education, regular and special K–12 education (public and private), higher education, and adult/vocational education.

Organization

The ERIC system began in 1966 and is decentralized in nature, with the bulk of the work done by 16 different subject-specific clearinghouses at different locations in the country (see Figure 1). The system is administered by the U.S. Department of Education's Office of Educational Research and Improvement (OERI).

The ERIC system has hundreds of informal and formal partnerships with other organizations who disseminate information to the education community, and some of the ERIC clearinghouses have especially strong formalized relationships with organizations known as adjunct clearinghouses. For example, the ERIC Clearinghouse on Elementary and Early Childhood Education has forged an adjunct clearinghouse relationship with the National Child Care Information Center (NCCIC). NCCIC provides assistance to ERIC/EECE staff on child care related questions and issues, assists in the acquisition of documents related to child care, and, when appropriate, refers questions from their users to ERIC/EECE. ERIC/EECE maintains the World Wide Web site for NCCIC and collaborates in meetings and publication ventures.

Three support components to the ERIC system—the ERIC Document Reproduction Service (which provides the full text of ERIC documents to users in microfiche, paper, and electronic formats), the ERIC Processing and Reference Facility (which administers and maintains the ERIC database), and ACCESS ERIC (which is the publicity arm of the ERIC system) support clearinghouse efforts, create the ERIC database, and provide document delivery for ERIC documents.

ERIC Clearinghouses

- Adult, Career, and Vocational Education
- Assessment and Evaluation
- Community Colleges
- Counseling and Student Services
- Disabilities and Gifted Education
- Educational Management
- Elementary and Early Childhood Education
- Higher Education
- Information and Technology
- Languages and Linguistics
- Reading, English, and Communication
- Rural Education and Small Schools
- Science, Mathematics, and Environmental Education
- Social Studies/Social Science Education
- Teaching and Teacher Education
- Urban Education

Adjunct ERIC Clearinghouses

- Child Care
- Clinical Schools
- Consumer Education
- Educational Opportunity
- Entrepreneurship Education
- ESL Literacy Education
- International Civic Education
- Law-Related Education
- Service Learning
- Test Collection
- U.S.–Japan Studies

Affiliate Clearinghouse

- Educational Facilities

ERIC Support Components

- ACCESS ERIC
- ERIC Document Reproduction Service (EDRS)
- ERIC Processing and Reference Facility

Figure 1. ERIC system components.

ERIC Clearinghouse Functions

Each clearinghouse provides a number of products and services, including acquisitions and database building, publications, Internet services, and user services.

BEST COPY AVAILABLE

Database Building. The ERIC database is composed of citations and abstracts or annotations to the education-related literature. The system as a whole currently indexes and abstracts journal articles from over 900 education-related journals. The database is also composed of ERIC documents that represent a wide variety of materials—from curriculum guides to project reports, student dissertations, books, and book chapters. About 13,000 citations to ERIC documents and 20,000 journal citations are added to the database each year. The ERIC database currently contains over 900,000 records from 1966 to the present. To accomplish database-building functions, each clearinghouse acquires materials, selects those that meet ERIC system criteria, and prepares database records for journal articles and documents.

Publications. Each clearinghouse produces approximately 12 full-text ERIC Digests yearly. ERIC Digests are two- to four-page reviews of the literature and position papers on a wide variety of education-related topics and currently represent the only full-text component of the database. Major publications are also published yearly (books and monographs), focusing on topics of particular relevance to the subject specialty of the clearinghouse. Other publications such as newsletters, resource lists, and subject bibliographies are also developed by ERIC publications staff at each clearinghouse.

Internet Services. Each ERIC clearinghouse has developed and maintains an Internet site on the World Wide Web, and Internet-based services have very quickly become an extremely important method of service provision for the ERIC system as whole. Clearinghouse Internet sites typically contain online versions of ERIC Digests and newsletters, as well as a wide variety of material devoted to the subject specialty of the clearinghouse—including some materials produced outside the ERIC system. For example, ERIC/EECE has collections of resources related to the Reggio Emilia approach to early childhood education, the Project Approach, and school readiness (ReadyWeb), in addition to links to other early childhood/elementary/middle school sites. The system as a whole sponsors 26 listservs, or electronic discussion groups, with over 20,000 subscribers. Two of the clearinghouses provide users with Internet-based access to searching the ERIC database, and the ERIC Clearinghouse on Assessment and Evaluation (in conjunction with the Educational Testing Service) provides users with the Test Locator Service, which allows users to access citations, abstracts, and publisher information for a large number of education-related tests, screening tools, and other measurement tools. Each clearinghouse provides access to a variety of informational resources related to their subject scope.

User Services. Each clearinghouse has staff who provide reference services to ERIC users to help them access the ERIC collection and find information related to their areas of interest, providing them with information resources and referrals. Requests to staff who provide these services vary from requests for known items (e.g., Digests, products that have been prepackaged to provide information on specific topics) to more complex queries that require customized responses. Examples of these sorts of requests are provided in Figure 2.

ERIC User Services: Overview

There has been a dramatic change in how users contact clearinghouses with requests for information over the past 5 years. In 1992, for the ERIC system as a whole, 56% of the requests were sent through the U.S. mail, 33% through phone calls, and only 4% through e-mail. By 1996, 93% of the requests for information were received through e-mail, with only 3% received through the U.S. mail and 4% through phone calls (Smarte, 1997, p. 5).

These statistics differ somewhat for ERIC/EECE, primarily because the toll-free phone number for NPIN is publicized frequently in publications such as the spring 1997 "Birth to Three" special edition of *Newsweek,* the Kaiser Permanente (a large health maintenance organization in California) patient newsletter, and over 500 American newspapers in the Gannet newspaper chain. Because of this publicity, about 25% of our requests come in through phone calls, and about 70% come in through e-mail. ERIC/EECE and NPIN also use the U.S. mail more frequently than other clearinghouses to send out customized responses, because many of the parents who call do not have access to e-mail.

In 1996, about 25% of the users of the ERIC system who sent requests for information were elementary or secondary teachers; while about 25% were college faculty or students, 26% were from the general public, and only 4% were parents (Smarte,

1997, p. 5). While this breakdown would have been about the same for ERIC/EECE in the early 1990s, these statistics have changed dramatically for ERIC/EECE because of NPIN and the Parents AskERIC service. As can be seen from Table 1, of over 6,100 questions sent to ERIC/EECE from September 1996 through August 1997 that required customized responses, about 31% were from elementary or secondary teachers, but nearly 21% were from parents, making them the second largest user category.

Table 1

Electronic User Services Statistics: September 1996 through August 1997 (6,111 Total Electronic Questions)

User Category	# of Questions	% of Total
Elementary/Secondary Teachers	1,882	30.8
Parents	1,271	20.8
Postsecondary Students	1,251	20.5
Postsecondary Professors and Researchers	659	10.8
Elementary/Secondary Principals and Administrators	390	6.4
Other Professionals	258	4.2
General Public	135	2.2
Elementary/Secondary Librarians	56	0.9
Elementary/Secondary Students	42	0.6
All Others (7 additional categories)	135	2

From June 1997 through September 1997, parents were actually the largest category of users who sent requests for information through e-mail that required customized responses. During this period, about 27% of the requests came from parents, 25% from college students, and 24% from teachers. Although this pattern may be in part because many teachers have 8 to 10 weeks off in the summer and send fewer questions during this time, nonetheless, this period was the first time that parents were the largest user category for ERIC/EECE. Because of the NPIN publicity previously mentioned, parents are the largest category of users who require customized responses through the U.S. mail, with about 67% of these packages of information being sent to parents.

AskERIC

The AskERIC electronic reference service began in 1992 as a special project of the ERIC Clearinghouse on Information and Technology (ERIC/IT). AskERIC provided a way for the ERIC system to take advantage of the new online technologies, enabling user services staff to respond to requests that required customized responses in a more efficient manner through e-mail (Lankes, 1993, 1995; McKee, 1995). A Web site for AskERIC was added in 1993, and the system responded to its 100,000th question in fall 1997. Parents AskERIC was developed as an expansion of the basic AskERIC service in 1993.

Users of the AskERIC service send their questions (see Figure 2 for sample questions) to an e-mail address, which is advertised through brochures and at many places on the Internet (currently the address is *askeric@askeric.org*). Staff members at ERIC/IT respond to over half of the questions, and they forward questions that relate to the clearinghouse subject scope to the subject specialty clearinghouses who participate. The system can handle over 1,000 questions weekly. ERIC/EECE and NPIN receive parenting questions as well as questions that relate to early childhood and elementary education, responding to as many as 150 questions a week as of October 1997.

Responses to Nonparenting-related AskERIC Questions

The vast majority of the questions that arrive at the AskERIC service receive an ERIC database search in reply—typically 10 to 15 citations and abstracts

related to the topic. The service is not intended to provide comprehensive database searching, except for those questions for which there appears to be only a limited amount of information in ERIC (e.g., "What does the research say about the use of fat or large diameter pencils for primary age students?"). Clearinghouses are free to search other databases when appropriate, or if they so choose.

Full-text material from ERIC is sent whenever possible (usually ERIC Digests), but material from other organizations such as the National Association for the Education of Young Children and the National Network for Child Care, whose copyright rules allow distribution of their materials for educational purposes, is also sent. Beginning in fall 1996, user services staff who respond to AskERIC questions also were required to send at least one Internet Web address related to the question. AskERIC users also receive referrals to organizations and agencies (addresses and phone numbers) whenever appropriate.

The AskERIC service has an educational function. Users are provided with the search strategies for the ERIC database, they are told where they can go to obtain the full text of ERIC documents and journal articles, and they are given an Internet site URL where they can find additional resources. Figure 2 lists several AskERIC questions that were received at ERIC/EECE in fall 1997. Examples of parenting questions and discussions of what can and cannot be provided to parents through an electronic reference service such as Parents AskERIC will be presented later in this paper.

Each of the questioners in Figure 2 received a customized response prepared by user services staff at ERIC/EECE. For the first question, which focuses on the issue of inclusion of fifth-graders in a middle school setting, the user was referred to the toll-free telephone number of the National Middle School Association (NMSA), received the full text of an article on this topic that appears on the NMSA Web site, and was sent 10 citations/abstracts from the ERIC database that addressed the issues brought up in the question.

The second and third questions regarding year-round education and ability grouping represent topics that have a large amount of material to choose from in the ERIC database, including full-text Digests. There is a national association for year-round schooling, to which the user was also referred, and other relevant Web sites were also provided.

The issue of ability grouping is frequently discussed on listservs such as MIDDLE-L for middle school teachers and administrators, and in addition to citations, Digests, and Internet sites, the user was referred to the MIDDLE-L archives on the Internet and told how to search for relevant postings.

1. Our community is currently debating building a new middle school and moving the fifth grade, currently in elementary schools, to this new facility. My question is whether there is literature concerning the appropriateness of grouping fifth-graders in a middle school environment.
2. We are researching the possibilities of changing our K–5 school to a year-round school schedule. Any data pro or con would be greatly appreciated.
3. What information can you give me in regards to homogeneous vs. heterogeneous ability grouping of elementary-aged students?
4. My name is Lucy, and I am looking for articles that deal with the effectiveness of the Kids on the Block Puppet program. So far, the only thing I have been able to find is Heidi Tortorella's article, "Teaching Human Diversity in Middle School." I would appreciate any titles or resources that you may suggest. Thanks for your help.
5. Can you tell me the kindergarten entrance ages for each state?

Figure 2. Sample AskERIC information requests.

The Kids on the Block puppet question is a fairly straightforward one; there are about a dozen ERIC citations on this disability awareness program that were provided to the user, along with the Web site address for Kids on the Block, which provides links to puppet troupes in the United States and Canada, information about how to make the puppets, and general program information.

Finally, the question on kindergarten entrance ages for the states represents one for which there is a specific answer (a relatively rare occurrence for education-related questions sent to AskERIC!). The Education Commission of the States maintains and updates this information on its Web site, and the commission allows us to download the file and send it to users, along with their Web address.

Parents AskERIC

The Growth of Parenting Education

Systematic attempts to provide information on parenting skills have been documented from early history to present day. For example, young married women in Victorian times were instructed about parenting by people such as Charlotte Mason (1904) in her book *Parents and Children.* These early books and articles featured tips on thrifty household organization, meal preparation, child rearing, and educational techniques. In the United States during the early 1900s, a "mother's friend" or "friendly visitor" were the names given to home visitors who were part of a program designed to provide support to needy families or widows (Carter, 1996, p. 2). Education, in the form of information on hygiene, nutrition, and child safety, was a key component with early home visiting. Rural women benefited from group meetings provided by the U.S. Department of Agriculture's Extension Service. These meetings, guided by the cooperative extension agent and women from the community, provided courses on various aspects of home management, including child development. For most people, however, parenting support and education were provided through informal networks and extended family members and friends.

In 1946, a book written by Dr. Benjamin Spock, *Baby and Child Care,* was designed to speak directly to parents, and it quickly topped the best-seller list, eventually selling more then 39 million copies (Carter, 1996, p. 3). The huge popularity of this parenting book may have resulted from the growing mobility in American society (which was breaking down some of the informal support systems and pushing parents to seek other resources). Perhaps it was successful because a new generation of young mothers, many of whom had held demanding jobs during the employment shortages of World War II, felt capable of breaking from tradition to seek other solutions to their child-rearing questions. Whatever the reasons, the success of *Baby and Child Care* has, for many, been viewed as a symbolic turning point for the development of a new wave of information and support that responds directly to parents.

Fueled by growth in academic areas relating to child development, psychology, and education, other books and programs quickly followed, including federally funded programs such as Head Start in the 1960s. These social initiatives raised hopes that early childhood education combined with parent education would help break the cycle of poverty for needy families. By the 1970s, there were hundreds of parenting books and community-based programs that had been developed to assist the young or new mother. Hospital maternity wards were frequently the home for classes that provided education on childbirth and newborn baby care.

As parents became more knowledgeable, they wanted useful information about their older children as well, and they began to seek out other experts to answer their questions. Today, there are more than 50,000 parenting programs sponsored by many different groups, including medical professionals, allied health professionals, educators, social workers, extension services, psychologists, and religious organizations (Carter, 1996, p. 4). No longer are parenting education programs considered as aimed at the poor or neediest families. The term "parent education" now encompasses a wide variety of formats, content, and programs (Gorman & Balter, 1997, p. 340). Many parents and people who are working in a parenting capacity, such as step-parents, domestic partners, and foster and adoptive parents, are demanding high-quality information on more effective ways to raise and educate their children. It has become clear that information on parenting education should be accessible to all parents and people who are supporting children and families.

Also during the 1970s, the potential of the mass media and the telephone as influential tools to teach skills for parents emerged. Research by Samuels and Balter (1987) found that the telephone was an effective tool for responding to parents' questions as well as for reassuring them about common concerns. Parents indicated that they liked having someone to talk to who was "unbiased and educated" (Samuels & Balter, 1987, p. 30). Other work by Popkin showed that video clips of interactions between parents and children were useful tools to suggest positive alternatives to parents and that parents enjoyed the multimedia approach (Popkin, 1987, p. viii). The step taken by ERIC to merge technology, information services, and the developing field of parenting education through the NPIN project pioneered a new approach to support parents and professionals who work with parents.

Other noncommercial and commercial parenting Web sites that started during the 1990s included

the National Network for Child Care, CYFERNET, Parentsoup, ParentsPlace, and the Family Education Network. Over the past 3 years, hundreds of new Web sites focusing on parenting issues have emerged, and this trend will likely continue as more people gain Internet access. Although NPIN began with a Web site and the Parents AskERIC service, the NPIN Web site may be the largest nonprofit parenting Web site. The site provides access to a variety of resources and services, including the full text of public domain materials intended for parents and professionals to copy and duplicate for nonprofit use. Many of the full-text resources and *Parent News* articles, as well as the listings of Web sites and organizations, are prepared for the NPIN Web site in direct response to frequently asked parenting questions from the Parents AskERIC service. By using this participatory method, NPIN works to find and develop useful resources for parents and professionals who work with parents.

Responding to a Typical Parents AskERIC Question

Typical topics mentioned in Parents AskERIC questions over the course of a month might look like those in Figure 3. A broad range of issues may be raised over the course of a month, and although the general topics are often similar, the individual question or perspective on the topic is often quite unique. A typical Parents AskERIC question might look like the following:

> *Dear ERIC,*
>
> *I just met with my son's kindergarten teacher, and she told me that she feels that he needs another year to grow. She wants him to repeat kindergarten next year. I don't really understand why, and I haven't told my son yet. I'm so afraid of what this might do to his self-esteem, but I don't want to push him on if he isn't ready. I really want to do the right thing. Please send me any information you have on retention in kindergarten. Anything would be greatly appreciated.*
>
> *Thanks in advance,*
>
> *Louise*

Over the past years, we have learned much about how electronic services such as NPIN can and cannot ethically respond to these and other parenting questions. As we have thought about the kinds of responses that we might provide to questions such as this one, we have developed a graphical representation called the "parenting education spectrum" that helps us identify the range of support that can be supplied to parents through parenting education information services and programs (Figure 4). The spectrum defines services into five major categories. One end of the spectrum falls into the area of information resource and referral, while the opposite end of the spectrum reflects the one-to-one support for parents that is available through home visiting or counseling. In between the two ends of the spectrum are support systems that range from those that are able to supply a few suggestions or strategies to community-based programs intended to support parents generally.

sibling rivalry	parental involvement
toilet training	special needs children
divorce	father involvement
custody issues	home schooling
benchmarks in child development	aggressive behavior
family communication	positive discipline
adolescent behavior	program development
substance abuse	choosing a school
resources for gifted children	family literacy

Figure 3. Parenting question topics.

The spectrum may also help new parenting education programs consider what support is currently being provided within a community, and it can help them discover where there may be gaps in service delivery. Careful consideration of the population that the program is serving and staying within the program's scope is particularly important for electronic parenting education and support services provided by services similar to Parents AskERIC and NPIN.

With access to the ERIC database and the World Wide Web, NPIN has the potential to serve an international population of parents who have Internet access. The toll-free telephone line serves an additional population of people residing within the United States who may not have computer access. NPIN provides a large collection of diverse parenting resources on the Web site and/or refers users to ERIC documents, research, popular

parenting books, or organizations. However, it is difficult to envision how a nationwide electronic service like NPIN could offer the more intensive support that is possible through community programs or counseling. This type of direct service can be provided through community networks where the parent resides, by trained professionals who are sensitive to issues within the community and who can develop a relationship with individual families. Parents AskERIC can also provide support to these community services when the service's information referral resources are used to help callers contact the support networks within their communities.

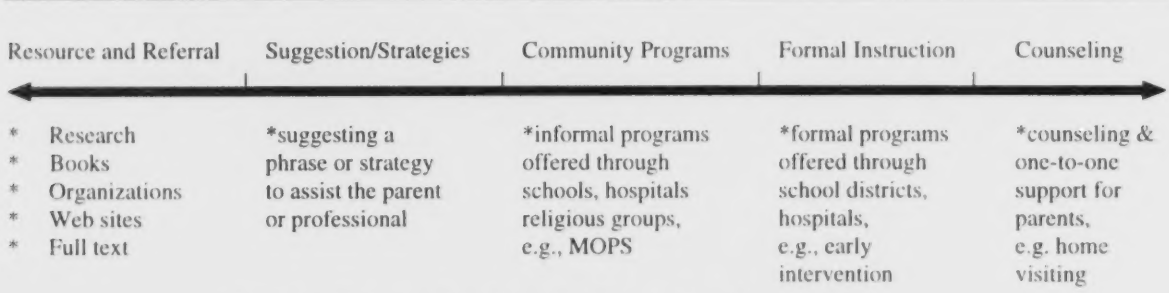
Resource and Referral
Suggestion/Strategies
Community Programs
Formal Instruction
Counseling
* Research
* Books
* Organizations
* Web sites
* Full text
*suggesting a phrase or strategy to assist the parent or professional
*informal programs offered through schools, hospitals religious groups, e.g., MOPS
*formal programs offered through school districts, hospitals, e.g., early intervention
*counseling & one-to-one support for parents, e.g. home visiting
Listening, Understanding, Accessible Support, Experience, and Education

Figure 4. Parenting education spectrum.

Taking into consideration the AskERIC program's scope and the parenting education spectrum, our typical response to a Parents AskERIC question is very focused. It includes a short narrative that acknowledges the parent's concern, commends the parent for asking the question, and provides background information to inform the parent's decision making, and suggests immediate strategies that can be used by the parent in asking better questions, or a strategy that other parents have found helpful when addressing a similar problem. In addition, the response would likely include useful references to more in-depth information, such as citations from the ERIC database; some suggestions of relevant parenting books, articles, or quotes from experts in the field; reference to organizations or Web sites; and, if possible, information on support services within the caller's community.

As the Parents AskERIC service grows, NPIN will continue to refine the answering techniques. NPIN also plans to study the effectiveness of our answers and thereby gain a deeper understanding of the needs of parents and of ways to facilitate access to parenting support through technology, media, and the community.

Other Issues and Concerns Related to Electronic Reference Services

Issues related to the provision of electronic reference services have received increasing attention in the library and information science literature (Evans, 1992; Kluegel, 1995). Among the issues, concerns, and trends that the literature addresses and that have become evident through the provision of electronic reference services through AskERIC are the following points:

1. In electronic reference service, the give and take that occurs between a patron and a librarian in a reference interview at a traditional library setting is very limited. It is sometimes difficult to clarify what the user meant when the question seems to be vague or could be interpreted in different ways. Some users send their phone numbers, or staff can send an e-mail message asking for clarification, but because of the large volume of questions that are responded to in a given day, these approaches are considered to be too time-consuming to employ as a general rule. Instead, the Parents AskERIC staff at ERIC/EECE will typically send a response based on their "best guess" interpretation of the

question and ask the user to send further questions if necessary.

2. As mentioned earlier, staff at ERIC/EECE and NPIN, and other ERIC clearinghouses as well, respond to a high volume of questions, and staff resources become strained at times. AskERIC questions are expected to be responded to within 48 hours (2 working days). At ERIC/EECE, it has been determined that staff members should respond to three questions every 2 hours—a rate that is not always easy to achieve. Saving files for use with repeat questions (such as the issue of whether twins should be separated in elementary schools) and the resources provided by the AskERIC staff at ERIC/IT are helpful, but the majority of questions are either unique or have some unique aspects that require at least some new effort at searching for information beyond saved files. Time studies and efforts at production improvement continue, especially at peak question load times in the fall and spring.

3. Internet copyright issues are a problem in the preparation of customized responses for delivery through the U.S. mail and are also an issue in electronic reference work. Care must be taken not to download and send copyrighted files to users, giving them instead only the URL Web addresses where the information exists. Given that users like to receive full-text information and that many users may have e-mail but not readily available World Wide Web access, copyright can be a problem even in electronic reference work. Locating high-quality information on the Internet that is in the public domain and working to receive author permission for educational use as needed are important tasks that greatly improve AskERIC service quality.

4. The Internet has clearly made the AskERIC service possible, effective, and valuable, enabling us to respond to a greater variety of questions with useful information. In 1994, the user typically received only an ERIC database search in response to his or her question. Since that time, access to public domain articles from the U.S. Department of Education, other ERIC clearinghouses, and other agencies and organizations who focus on topics of concern to the users have greatly improved the quality of the service.

5. Finally, providing reference services through electronic means can be less reinforcing for staff who prepare the responses than library-based reference work, because the vast majority of users say their "thank you's" in the body of their question and few reply after receiving a response to let AskERIC staff know whether or how the information provided was useful to them. Only 5% to 10% of users send follow-up messages. This lack of feedback points out the need for a periodic, systemwide AskERIC evaluation. A user survey is currently being prepared to assess the effectiveness of PARENTS AskERIC and to ascertain what can be done to improve the service.

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NeighborhoodLink:
A Community Network for Cleveland's Inner City

Mary Ellen Simon[1] ■

Abstract

The Internet has great potential for educating and informing those who use it—but only if they have access to educational content that informs them in a way that meets their needs. Just as public libraries provide access to information for all citizens, the ramps to the information superhighway must be open to all, not just those who can afford it. Many community-based groups, nonprofit agencies, and institutions have volunteered to give all children and families, especially those who cannot afford it, access to the best of the Internet with content that is important, accurate, and appropriate for their needs. NeighborhoodLink is a community network that focuses on the needs of low-income people. Because this focus is somewhat different from most community networks, the content it provides reflects that difference. The study described in this paper is a search for NeighborhoodLink's special identity as an urban community network. To improve the content of NeighborhoodLink for low-income families and children, the study looked at similarities and differences in over 20 models. LibertyNet and Charlotte's Web proved to be the two most appropriate models, providing NeighborhoodLink with ideas for local information that can be adapted and replicated, but several other models also provided information and potential links. An unexpected benefit of the study was the recognition of the accomplishments of NeighborhoodLink that are exceptional. Although all community networks require much of the same basic information and services, each network needs to find its own niche to provide relevant and important content in an organizational structure that works.

■

Introduction

The Internet has great potential for educating and informing those who use it—but only if they have access to educational content that informs them in a way that meets their needs. Just as public libraries provide access to information for all citizens, the ramps to the information superhighway must be open to all, not just those who can afford it. Many community-based groups, nonprofit agencies, and institutions have volunteered to give all children and families, especially those who cannot afford it, access to the best of the Internet with content that is important, accurate, and appropriate for their needs.

The study *America's Children and the Information Superhighway: An Update* (Children's Partnership, 1996), aware of the impact that the newest technologies have on young people's ability to "compete effectively in the changing job market," is especially concerned with "poor children at risk." The study reports on the widening "gap between the information technology haves and have-nots" (Children's Partnership, 1996, p. 3):

- 82% of high school students from the most affluent homes have access to computers at home, compared to 14% of poorer high school students.
- 31% of schools with a large proportion of students from poor families have access to the Internet, compared to 62% of schools with higher income students.

The Morino Institute, a Washington-based foundation and institute committed "to assist(ing) organizations and individuals in the use of information and

[1] Mary Ellen Simon was unable to present this paper at the conference because of illness.

electronic communications to work for positive social change" (Morino, 1997a), has published several electronic articles (see http://www.morino.org) dealing with the importance of access to advanced technology for all people. Mario Morino, founder of the institute, writes that "If properly harnessed and structured in a supportive, collaborative, human context, this technology can be a powerful and useful tool for changing people's lives" (Morino, 1997a).

The public has become aware of the need for parents, children, and teachers to become competent in using the newest computer technology for educational purposes. What many people do not know is that "some of the most pioneering and promising applications of technology for young people and their families" can be found in local community networks around the country (Children's Partnership, 1996, p. 5). In fact, many of us do not have a clear idea of what a computer community network is.

In common usage, the term *community network* has been applied to any system that has community-related content or is directed at a local audience. Beamish (1995) suggests that multiple meanings for the word *community*—it might be a "physical place such as a town, city, or neighborhood," or "a social group . . . that shares common interests"—make it possible to attach many different meanings to the term *community network*. A history of community networking produced by Morino confirms that the term has a history of vagueness (see Morino, 1997b).

In some cities, community networks have grown or evolved from FreeNets or community bulletin boards, so much so that the name *FreeNet* became identified with community networks and is often mistakenly used as a generic term for community networks (Beamish, 1995). Kanfer and Kolar (1995) write that many early community networks began simply as "land claims in cyberspace." This lack of focus resulted in networks being developed in many different ways.

When the World Wide Web, one of the most popular applications of the Internet, was developed, community networks popped up quickly, with recent estimates showing a new Web page being created every four seconds. These networks grew with little planning, and content was often developed based on whatever data were on hand. Some networks simply provided services such as bulletin boards; some provided information from the library staff or nonprofit groups who were starting up or expanding the network.

NeighborhoodLink is one of the community networks that is among a "handful. . . focusing on the needs of low-income residents" (Children's Partnership, 1996, p. 5). As one of these few, NeighborhoodLink is somewhat different from most community networks, and the content it provides needs to reflect that difference.

This study is a search for NeighborhoodLink's special identity as a community network—an identity we hope to find by looking at similarities and differences in models that might be replicated. In documenting this search, I hope to be able to give those who volunteer on NeighborhoodLink committees a clearer sense of direction; and in explaining the challenges we face in our growth process, I hope to give helpful information to other community networks.

NeighborhoodLink

Background

In 1994, as part of a nationwide community network movement and using the model of the United Neighborhood Houses of New York, the NeighborhoodLink task force came together to create a community network specifically targeted at reaching and informing Cleveland's inner-city residents. NeighborhoodLink was designed to be both a community network on the Internet and a community project working in the city's community centers. Initiated by the Greater Cleveland Neighborhood Centers Association (NCA), a local nonprofit agency, with three other community partners—Cleveland State University (CSU), the City of Cleveland, and Ameritech—a collaboration was formed to bring the Internet to low-income people in Cleveland's inner city. In 1997, NeighborhoodLink is surviving its fourth year, with growing pains in a few areas—most noticeably in financial and volunteer support and content development. Financial and volunteer support are essential to NeighborhoodLink's continued operation and merit a complete analysis as the subject of another paper. However, because they have an impact on content development, some mention of these factors is warranted.

Financial Support. Seeking funding at start-up, the collaboration of NeighborhoodLink's partners had responded to a request for proposals from the U.S.

Department of Commerce's National Telecommunications and Information Administration (NTIA) with a plan for the NeighborhoodLink project. Funding is part of the Telecommunications and Information Infrastructure Assistance Program (TIIAP) of NTIA that "supports projects that increase access of the underserved such as inner-city and remote, rural minority populations to social services and information made available via information infrastructure" (U.S. Department of Commerce, 1996).

Although NeighborhoodLink's original request for funding from NTIA/TIIAP was not successful, funding from local foundations was obtained. Grants from the Gund Foundation, the Cleveland Foundation, and the Thomas H. White Foundation gave the project the dollars needed to begin. Now, as this financial support is running out, funding is again an ongoing concern.

Volunteer Support. Significant volunteer support at start-up had taken care of several program components: computers, wiring, and training. The first two items were technical considerations that Ameritech and the Greater Cleveland Neighborhood Centers Association (NCA) had agreed they would provide. Ameritech donated computers, hardware, and phone lines; the NCA supplied the space, the "family rooms," for computer use.

The third item, training, was supplied by NCA personnel, who trained the staff in use of the Internet at five neighborhood centers, two city recreation centers, and five partners' locations. The center staff, in turn, trained the end users—the neighborhood people who visit the community centers—and supported them in their efforts to become computer literate. Although much of the training took place during 1995, it remains a constant requirement as trained personnel leave center jobs and new untrained people replace them. Volunteers are relied on for many of the network's needs, and although many are willing to help, their time is limited.

Content Development

NeighborhoodLink content began with only a few pieces of original data and several links to national sites, admittedly not the best way to establish high-quality content. Development of content, whether it is original local information or linkages to already established Web sites, requires planning, extensive searching, and volunteer hours; and volunteers could not provide any of those.

Local information, other than simple address lists and directories, can be difficult to compile, and once the information is gathered, the HTML writers must be found to convert the text into the language of the Internet. NeighborhoodLink was able to call upon Cleveland State University student assistants to do most of the HTML conversion, as have other universities, which seems to be the most cost-effective solution to the problem ("Colleges Ponder Pros and Cons," 1997). Most community networks rely upon large numbers of volunteers, and some sites, such as Charlotte's Web, request volunteer participation on the pages of their Web site.

In NeighborhoodLink, it was decided that content development would be assigned to committees, with each group locating, gathering, and posting local information. Some of the first information presented on NeighborhoodLink was related to vital statistics (e.g., how to obtain a birth or death certificate from City Hall). This type of city information was expected from the City of Cleveland, but the city's scant resources limited volunteer time and resulted in limited participation from the city.

Moving on, the committee decided that although government and city information had been an early priority for a content area, it was not the only one. Six other content areas were quickly decided on: education, employment, health care, housing, informational resources, and family services. Subcommittees of volunteers with expertise in these subjects were set up for each content area, and the chairpersons of these subcommittees were designated as the Steering Committee, which has responsibility for decisions on future support, content development, expansion of sites, and maintenance of hardware and Web sites.

Assigning a group or committee of volunteers shared responsibility for finding and entering content may be a good way to develop content, but the process is difficult if volunteers do not have clearly defined tasks. The quality of content in community networks is directly related to the amount of time spent on compiling local data and information, organizing that information, and locating new useful links. The content needs to be enhanced, reviewed, and updated, with relevant and important information continually being added.

Content development is time-consuming for volunteers, but the task is simplified when an online model fits the needs of the community and volunteers have solid ideas for content in each subject area.

Content for Inner-City Users

NeighborhoodLink is trying to gather and provide content that is useful to and of specific interest to a low-income, inner-city audience, but not without the usual content of a more general community network. And because a significant portion of the area's inner-city residents read at the seventh-grade reading level, a reasonable amount of material needs to be written at about that level, with a layout designed to provide easy access to information. Although some of the fun of "surfing the net" is finding unexpected treasures of information, disorganized data frustrate users who do not have the time or experience to distinguish the useful information from the worthless.

The specific kind of Internet information that benefits low-income families and children would most likely not have any commercial value. Nonprofit organizations and community networks would be the providers interested in supplying most social service and education information for low-income users. For instance, helping people find GED or parenting classes would be of more interest to nonprofit, social service agencies than to a commercial enterprise. NeighborhoodLink partners believe that this specific kind of content would be useful for community networks serving low-income users or clientele. There are, however, several other models that can be discovered by searching other community networks.

Strategic Planning and Decision Making

Who decides what the inner-city community needs? How do we know we are providing beneficial information and services? NeighborhoodLink has tried to answer these questions by recruiting representatives from over 90 local organizations or local branches of national groups—the Cleveland Public Library, the Urban League, the National Aeronautics and Space Administration (NASA), the local Public Broadcasting System (PBS) affiliate, foundations, city representatives, social agencies, schools, technical centers, and local colleges.

To determine that the information we provide is beneficial, the NeighborhoodLink project has encouraged feedback from the end users. Staff at the NeighborhoodLink sites talk with local residents as they train them and discuss their information needs. Understanding what the users want and need is only half the work, however. It is also necessary to understand and educate users about what community networks can provide for them—beginning users are not aware of all the possibilities until they have experienced some of the potential of the Internet.

Community Networks Unlimited

Community networks have often been discussed collectively because they appear to have similar community-related goals and local audience, but a more formal definition of the term helps to recognize that there are a variety of community networks. The following definition was developed by the Chicago Coalition for Information Access:

> A community network is a computer-based electronic network that provides a wide range of public and community-based information and services to people in a community for little or no cost. Although not a requirement, these systems are generally administered by nonprofit groups or governmental agencies. Attention is paid to providing access to people who traditionally have little or no access to electronic information and services. Generally community networks are activist-oriented, and have been established primarily to meet social needs rather than financial goals. Outreach to and feedback from the community are vital to the system, offering a participatory medium, utilizing the principle of many-to-many communications. (Chicago Coalition for Information Access, 1996)

This definition identifies several of the community network elements that make a difference—service, content, audience, cost, orientation, goals, methods of outreach, and feedback—and shows just how broad a range is covered by the term *community network*.

Beamish (1995), in an attempt to classify this broad variety of community networks into more specific categories, identified four: FreeNets, bulletin boards, government-sponsored networks, and wired cities. The list is obviously just a beginning and, as such, is incomplete; clearly, a community network such as NeighborhoodLink does not fit into any of those categories. In another attempt to narrow down the variety of networks that are

generalized under the too-broad term of community networks, Kanfer and Kolar (1995) suggest the term *citylinks* for urban networks, but this term can easily be confused with commercial city sites. I would like to suggest the term *urban community network* as perhaps a more precise term for an inner-city community network such as NeighborhoodLink, a term that would provide an identity that is distinct and identifiable.

Access Unlimited

Community networks have a variety of models that try to overcome the physical barriers to access. Programs such as the Diversified Information and Assistance Network (DIANE) Project at Tennessee State University focus on the teleconferencing potential of networks to overcome those barriers, providing experiences such as special field trips for its isolated rural population. Other projects focus on delivery of the computers to the school setting or community such as the *CyberEd* project in which a 120-foot, 18-wheel trailer-truck, packed with six computer stations and a large monitor for group sessions and videoconferences, visits low-income areas around New York City and Baltimore.

Another program, *Technology 21*, connects public schools in Chicago, New York City, Pittsburgh, and San Francisco through Web sites and videoconferences "so that educators can share their experiences and students can learn from other institutions" ("Roving 18-Wheeler," 1996, p. A21). The Stockyards Neighborhood project in Cleveland provides renovated computers for low-income families, while the Blacksburg Electronic Village provides computers and a community network (see http://www.bev.org) for everyone in the small town.

More conservative studies suggest after-school recreation centers as locations that are accessible for computer activities for low-income youth (Children's Partnership, 1994). This path is, in fact, the one that NeighborhoodLink has taken, with Neighborhood Centers Association placing computers in community settlement houses and recreation centers. Recently, a new city-sponsored program is placing more computers in the city's recreation centers, agreeing that these locations have been working well for Cleveland's inner-city population. The decision to use the recreation centers and other community centers is satisfactory to those who work on the NeighborhoodLink project.

NeighborhoodLink: Content Limited

NeighborhoodLink content has been limited thus far to those areas that the local community would find useful and relevant, but at the same time, it has been designed to offer the user a variety of links and original data. Some choices take users directly to a local site such as "Teaching Cleveland," which provides historical text and graphics about the city. Another page links the user to large content areas such as Ameritech's Schoolhouse Server, which can introduce beginning users to a vast array of educational links. And, of course, NeighborhoodLink has a link to the Cleveland Public Library, as every community network does to its local library. A very popular link takes the user to the Regional Transit Authority (RTA) Web site, which gives information about bus timetables, route maps, and job listings.

Several local sites were chosen and linked in the area of education: Empire Computech Center, the computer magnet school in Cleveland where second- and fourth-graders produce computer projects online; the K–12 home page developed by Cleveland's NASA Lewis Research Center, which provides math and science projects for teachers and students; a sample math proficiency test for ninth-graders; Project Act, a local homeless children and youth program; State of Ohio information, including a link to *Ohio SchoolNet*, which provides information about state initiatives to provide technology networks and computers for public schools; and *Ohio Education Management Information System (EMIS)*, which provides extensive and detailed statistical information about Ohio's school districts. Having a good, but small, collection of local information pieces, NeighborhoodLink is striving to expand and improve content to compare favorably with the best models, motivating both volunteers and users in their separate tasks.

Models of Content

A search for models of content was initiated using several lists of community networks found online, including a list compiled by Beamish (1995); an annotated Web site of NTIA-sponsored projects as models (U.S. Department of Commerce, 1996); a community computer network survey compiled by Doug Schuler of the Seattle Community Network (Schuler, 1994); and a 1996 review of community networks compiled by Kim Gregson of Indiana

University (Gregson, 1996). To improve the content in NeighborhoodLink for low-income families and children, I reviewed over 20 of these community networks (see the Appendix) and chose the following models as being potentially helpful for NeighborhoodLink.

Philadelphia/LibertyNet

LibertyNet states as its goal: "to be the leading online publisher of information about the Philadelphia region by providing a voice for the community; to provide resources and direction to help the region's non-profit organizations use the Internet to meet their goals; and, to bridge the gap between underserved groups and technology by supporting neighborhood Internet access centers." The founders of this site seem to come down on the side of the nonprofit agency rather than the individual, as a way to "empower community members . . . [by providing] them with the necessary technical support, education and training" (see http://www.libertynet.org:80/ln/about). In spite of this somewhat different slant, NeighborhoodLink can still find a significant model in this community network because it has a strong focus on information for the entire community, including the inner city.

The main home page for education on LibertyNet has extensive information and links to data on the local school district and the primary Philadelphia libraries. Similar to NeighborhoodLink, other headings include colleges and universities, K–12 public schools, K–12 private schools, libraries, adult education, and education-related organizations. The vast number of links in each category, however, surpass NeighborhoodLink's and make it impossible to list them here. A few representative sections are summarized—Adult Education and Neighborhoods Online—as examples of relevant content for urban community networks.

The Adult Education section includes information on graduate school housing, centers for fine arts and ethnic studies, college libraries, magazines with local resources for parents, a literacy center, Hispanic agencies and organizations, community colleges, churches, art schools, a computer and graphics training center, historic sites and organizations, the YMCA, a writing site, TV sites, and a Workforce 2000 training program site. The selections are a mix of links and original data that would be useful for any community network, along with some that are especially good for urban community networks (e.g., the literacy center).

Neighborhoods Online has content aimed at activists, researchers, and policy makers with a higher reading level, and it contains links to sites on a variety of topics, including national education goals; White House releases on education; education listservs; ERIC's Urban Education web; libraries; discovery learning sites; historically black colleges; advocacy groups, including the PTA, National Education Association, American Federation of Teachers, and literacy sites; parenting and youth-related sites; the Children's Defense Fund; Kids Campaign; state and federal education sites with information about Goals 2000; Department of Health and Human Services information including Head Start; and Senate and House Committee information related to education.

Charlotte, NC/Charlotte's Web

Charlotte's Web is a community network that has received some NTIA funds and aims "to help people use telecommunications technology to improve their lives and foster civic involvement" (U.S. Department of Commerce, 1996). Charlotte's Web serves 14 counties with "access, content, training and support in electronic communication." They "provide a range of free services and also provide 'wide-area' intranet and various Internet and networking services to nonprofits and small governments on a fee-for-service basis" (see http://www.charweb.org/webinfo/about.html).

The Charlotte's Web home page, although not specifically targeted toward the low-income, inner-city audience, has several pages that would be of interest to that group, including some devoted to jobs, health and human services, neighbors and communities, and education.

To show Charlotte's Web's usefulness as a model, the education content is comprised of sections on public and private schools, with information about school board candidates; a community guide to the school budget; a register of public schools; a list of local, independent, and neighboring schools and districts; colleges and universities with financial aid sites not found elsewhere; libraries, museums, and local history sites; federal government and education sites; information for students, teachers, and parents (e.g., an exceptionally good list of homework helpers, online magazines, and parenting sections); magazines, journals, and reports indexes (e.g., CARL and ERIC); and general references (e.g., dictionaries and statistics). Another valuable

section on Charlotte's Web called E-Lit (Electronic Literacy Project) includes GED practice study material that would be useful for an inner-city network.

Although replicating some of this information would require a significant outlay of time and effort (e.g., the local school information), others would require simple links; Charlotte's Web is a significant model that would keep any volunteer working on content busy for some time to come.

Cities/Community Sites: Boulder Community Network (BCN) and SmartCities

Two small city sites often recommended as community network models are the Boulder Community Network (BCN) from Boulder, Colorado, and SmartCities from Kansas City, Missouri. The Education Center of the BCN is organized under the following headings: general interest and continuing education, regional K–12 Schools, day care centers, K–12 educational forum, K–12 extracurricular activity ideas, colleges and universities, other Boulder area educational resources, and national and global resources. This site is rather small at present, but it supports the notion that a site may be better if limited and well-defined rather than attempting to meet every need a community has and losing its special identity in the process (see http://bcn.boulder.co.us).

SmartCities is a regional development group aimed at attracting business and creating jobs in the Kansas City area. It was developed by a coalition of public and private organizations with a mission to "modernize the information infrastructure . . . of the area to enhance the region's reputation as a leading edge area for doing business electronically" (http://www.smartkc.com). This commercial slant separates SmartCities from most of the sites examined, but it may be a link to employment information that Web sites on community networks would like to have.

Special Programs: Plugged In and Inner-City Net

Plugged In describes itself as a "non-profit organization established in 1992, [which] helps bridge the gap [between Silicon Valley and neighboring East Palo Alto] by bringing the benefits of computer and communications technologies to the entire community." Their mission has been to help "provide East Palo Alto organizations and families with access to computer technology, serving as a nationally recognized model for connecting low-income communities with the information economy. Community members of all ages use state-of-the-art computers to do online research, work on resumes, complete homework assignments, or participate in one of 30 classes offered in partnership with local agencies" (http://www.pluggedin.org/info/overview.html). The site has changed in the last 2 years; earlier versions emphasized online experimental projects and were directed more at the K–12 population. It now seems to appeal more to the high school to adult audience, with computer-related employment as a main goal for its users.

An interesting site for those who wish to target the inner-city population is the Inner-City Net, a work in progress like so many other Web sites. According to their online history, the "Inner-City Net was created by the Metropolitan Area Advisory Committee (MAAC Project), a community-based non-profit organization in San Diego County. The seed funding provided by TIIAP has been matched, to date, by support from Pacific Bell, MAAC, Girard Foundation and Parker Foundation." Their objectives are to provide Internet access, training, and content to some of the poorest neighborhoods in San Diego (see http://www.innercitynet.org).

Inner-City Net is a collaboration of six community organizations, each with a specific ethnic focus: Latino, African-American, Pan-Asian, or Native American. Inner-City Net is unusual in its focus on multiculturalism and in its approach to online Internet training. This model, like NeighborhoodLink, began with the problem of access, followed by training, and finally a search for content suited to the target population. The main content areas currently are entry-level local jobs, updates on community resources, services provided by local agencies, family and health care information, and discussion forums.

Conclusion: In Searching for a Model, We Find Ourselves

Reviewing models of a variety of community networks reveals characteristics of sites that are not obvious at first glance. Several models that had looked promising were eliminated from consideration when I realized how dissimilar their audience and needs were from those of NeighborhoodLink. In the end, LibertyNet and Charlotte's Web proved to be the two most appropriate models to provide NeighborhoodLink

with ideas for local information that can be adapted and replicated, but several other models have also provided information and potential links.

Reviewing models can also have unexpected benefits. As I scanned numerous models, I came to recognize the accomplishments of NeighborhoodLink that are exceptional. For example, the section on Cleveland Information supplies not only census statistics on the city's neighborhoods but also histories not available anywhere else, and the graphic history of Cleveland designed as a teacher's lesson plan is packed with data and photos that are an educational resource for any community user.

My study suggests that the process of replicating a model network is greatly enhanced for community networks when there is a clear understanding of the community's specific needs and audience. Any network provides better service for its users if it knows its place in the greater world of the Internet. Although all community networks require much of the same basic information and services, each network needs to find its own niche to provide relevant and important content in an organizational structure that works. It is becoming increasingly clear that the only way we will be able to manage the large and growing body of educational resources on the Internet is to focus on those that are of high quality and effective for their audience.

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APPENDIX

Model Networks Examined

Alachua Freenet
http://www.afn.org/

Aurora Online Community Network
http://www.aocn.aurora.edu/

Big Sky
http://macsky.bigsky.dillon.mt.us/

Blacksburg Electronic Village
http://www.bev.net/

Boulder Community Network
http://bcn.boulder.co.us/

Charlotte's Web
http://www.charweb.org/

Chicago
http://www.ci.chi.il.us/

Chicago Community Information Consortium
http://www.cnt.org/ccic.html

City Nets

Philadelphia
http://city.net/countries/united_states/pennsylvania/philadelphia/

Detroit
http://www.city.net/countries/united_states/michigan/detroit/

Civic Network
http://www.civic.net:2401/

Cleveland Live
http://www.cleveland.com/

Detroit Freenet
http://detroit.freenet.org/

Freenet list
http://www.netlab.co.uk/freenet/

Inner-City Net
http://www.innercitynet.org/

LibertyNet
http://libertynet.org:80/

Metroscopes

Philadelphia
http://metroscope.com/philly.html

Detroit
http://metroscope.com/detroit.html

Ohio Dept. of Commerce
http://www.ohiobiz.com/

Plugged In
http://www.pluggedin.org/

Prairie Net
http://www.prairienet.org/

Silicon Valley-Public Access Link
http://www.svpal.org/

SmartCities (Kansas City Area)
http://www.smartkc.com/

Suncoast Free-Net
http://scfn.thpl.lib.fl.us/

University System of Georgia
http://www.PeachNet.EDU/

Buying into the Computer Age:
A Look at Hispanic Families

Anthony Wilhelm ■

Abstract

Ownership rates of advanced communication technologies among Hispanic families are lower than the national average. Going beyond socioeconomic (i.e., family income, educational attainment, and occupation) indicators as key predictors of the so-called technology gap, this paper relies on qualitative analysis of Hispanic families' attitudes and opinions about computers to provide a richer context for understanding the gap. Six focus groups were conducted in the summer of 1997 (n = 72). Interviewees were recruited from Santa Ana and Riverside, California, and were eligible to participate if: (1) they were heads of household of Hispanic origin; (2) their yearly family income was between $25,000 and $65,000; and (3) they did not already own a home computer. Focus groups were balanced in terms of gender, and participant ages ranged from 21 to 64. Santa Ana focus groups tended to include mostly college-educated, professional, English-speaking, and native-born respondents, while Riverside focus groups included predominantly non-college-educated, working-class, Spanish-speaking, and foreign-born participants. The results of the focus group dialogues provided support for the following key findings. First, most respondents (over 90%) believed strongly that Hispanics need computers to keep up with progress. Not only were computers considered to be important, they were ranked behind "taking a vacation" as a priority in their household. Second, notwithstanding common wisdom, which suggests that Hispanic parents want a home computer principally for their children, focus groups revealed that heads of household most likely to purchase a PC in the next year would buy it for their own personal use as well as for their children. Third, while respondents found many advantages to owning a computer, the drawbacks were formidable, including anxiety over pornography on the Internet (a concern for two-thirds of participants, mainly female interviewees) as well as the antisocial nature of using computers in a family setting.

■

Introduction

A substantial gap in access to basic and advanced communication technologies separates Hispanics from society as a whole. For example, telephone penetration is lower among Hispanic households than Anglo households (Federal Communications Commission, 1997), and the same is true for computer ownership (National Telecommunications and Information Administration, 1995) and Internet use (Graphic, Visualization, and Usability Center, 1997). High-quality access to computers is important, as the U.S. Department of Commerce (1997) suggests in its report *America's New Deficit*, because "the sweep of digital technologies and the transformation to a knowledge-based economy have created robust demand for workers highly skilled in the use of information technology."

While there is a temptation to explain the technology gap solely in terms of socioeconomic conditions, recent research has revealed this approach to be reductive. With respect to telephone penetration, for example, Mueller and Schement (1995) described other reasons in addition to family income that explain whether a householder chooses to purchase telephone service. In addition, in analyzing U.S. Census data on computer ownership, Wilhelm (1996) showed that variables measuring socioeconomic status, such as occupation,

educational attainment, and family income, did not fully capture why Latinos lag behind their counterparts in home PC access. As Figure 1 reveals, at every (family) income group below $75,000, there is a substantial difference between Hispanics and non-Hispanics.

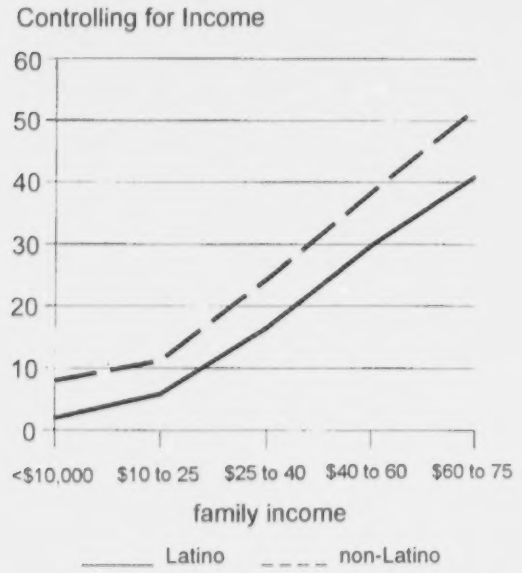

Figure 1. Home computer ownership.

Of course, socioeconomic status (SES) is critical to understanding computer ownership (Dutton, Sweet, & Rogers, 1989). Without disposable income, a householder cannot purchase a computer. People with some college education are more likely to find uses for home computers than are persons who have not completed high school. And those who occupy white-collar occupations are more likely to find reasons for needing a personal computer than are blue-collar workers. Nevertheless, when these SES indicators are held constant, Hispanics remain less likely than non-Hispanics to own a computer.

The next logical step in the research was to explain this ownership divide. This goal was pursued using focus groups. Focus groups are group interviews of 10 to 15 people, lasting 2 to 3 hours, on a limited number of issues. Of course, there are many income-related factors that probably explain part of this phenomenon, such as disposable income and family structure—issues that are discussed briefly in the concluding section of this report. The thrust of the qualitative focus group approach, however, entails probing respondents' attitudes toward and opinions about computers, their information-seeking behavior, as well as their experience with and exposure to computers outside of the home, such as in the workplace or at a community location.

While Census data enable us to identify factors that are associated with computer ownership, focus groups provide insight into the contours of people's lives, providing a context in which to understand better the patterns that distinguish certain ethnic and racial groups. These focus groups, then, are not representative of the Hispanic middle class as a whole; rather, they are at best suggestive of the sorts of opinions and attitudes that many Hispanics may hold.

Six focus groups were conducted from June to August 1997 comprising Hispanic adults recruited from the communities surrounding Santa Ana and Riverside, California. Individuals were able to participate if: (1) they were heads of household of Hispanic origin; (2) their yearly family income was between $25,000 and $65,000; and (3) they did not already own a home computer. Focus groups were balanced in terms of gender, and participant ages ranged from 21 to 64. When a participant is quoted in this paper, a brief profile is usually attached—typically, occupation, age, or household size—which provides a context to help readers visualize characteristics of people whom we interviewed. Santa Ana focus groups tended to include mostly college-educated, professional, English-speaking, and native-born respondents, while Riverside focus groups included predominantly non-college-educated, working-class, Spanish-speaking, and foreign-born participants.

Attitudes toward Computers

There is a general sense among the Hispanic heads of household whom we interviewed that computers are synonymous with the future, and that without access to advanced technologies, they and their families will not be able to keep up with progress. As one participant said, "the bus left without me, and maybe I should try to catch it." Teresa, a homemaker with four kids, proclaimed that "the computer is something wonderful . . . [and] as a mother, I don't want to be left behind." All told, the Hispanics whom we interviewed merely reflect the American faith in technology. As Grossman (1995, p. 166) suggests, "Americans have always had exuberant faith in the power of technology to improve society," and through the power of the market-driven media, this faith has been more or less maintained.

Purchasing a computer is also a priority among our interviewees. Our respondents played a hypothetical game in which they were asked to spend $10,000 on whatever big ticket item they wanted (up to five choices). The only stipulations were: (1) they had to spend at least $2,000 per item, and (2) they could not use the money to pay off debt. This game was played at the beginning of the focus group session, before participants were tipped off to the fact that they were being interviewed regarding their attitudes toward computers. Participants wrote down their answers rather than expressing them out loud, since it is often the case that when people's opinions are solicited orally, they are modified or biased in light of what previous respondents expressed. Figure 2 shows the five most popular responses from our 72 focus group participants. Interestingly enough, the computer was the second most frequently cited "big ticket" item, next to travel/vacation. Forty out of 72 respondents ranked computers on their list of items that they would like to purchase if they had the disposable income.

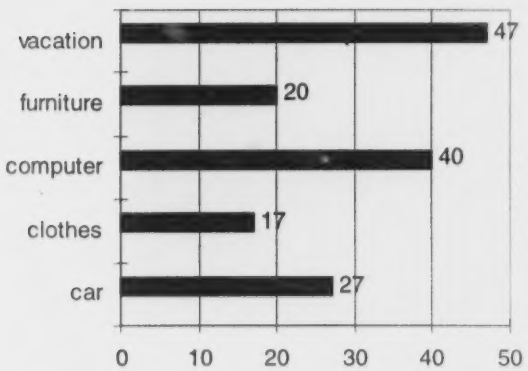

Figure 2. Prioritization of "big ticket" items (n = 72).

On the whole, parents agree that their children's use of computers is generally a good thing. In large measure, parents' attitudes toward computers are based on the good opinion their children have of their use of computers in school. Parents suggested that their children's experience with computers made them more likely to purchase one in the future. As Tom said concerning his child, "For me, when they come home from computer lab, that's what they talk about, 'Oh, I worked in the computer lab today. It was really cool. I learned all these different things.'"

At the same time, parental attitudes change when computers are put in a broader context of learning. For example, parents were concerned that their children learn the basics before they are exposed to computers. Ruben, an appliance salesperson with two children, argued that "if the child doesn't learn how to read, write, and express himself, the computer is not gonna help that person very much." Among Spanish-speaking parents, moreover, there is a concern that learning materials need to be in Spanish so that parents can help their children with their homework. There is an overriding concern that students bring home books to study and less of a desire for computer-assisted learning, unless it was bilingual.

Finally, some parents intimated that as long as their children got high-quality exposure to technology in the schools, there was less of a need to have a home computer. Put another way, parents' satisfaction with their children's exposure to computers in school is inversely related to their desire to purchase one for the home. Thus, the current universal service policy—the Snowe-Rockefeller provisions of the 1996 Telecommunications Act—may actually dissuade some families from buying a computer if they feel that their children have adequate computer/Internet time at school.

Obstacles to Ownership

The wish list enumerated in Figure 2 neither reflects what people can actually afford nor describes the relative weight of priorities within individual lists or between participants (i.e., there is no way to compare person A's preferences with person B's or how much more person A values his or her first choice over the number two preference). It should be mentioned, however, that only 10 people out of 72 ranked the computer as their first choice, while over one-third of respondents (25) said that a vacation would be their top priority if they had the money. One often thinks of upward mobility as enhancing one's quality of life, and an obvious expression of this perception is to have enough money to go on a vacation. The vacation is a reward for one's hard work that the whole family can enjoy.

While enthusiasm for computers was widespread, existing across income strata, 77% of respondents described the computer as "too expensive," as Figure 3 reveals. Many participants whose family income was in the $25,000 to $30,000 range were likely to rank purchasing a computer highly, while at

the same time, there was a very real sense that buying a computer would be deferred as long as they were solely able to take care of their families' essential needs, such as paying the rent or mortgage and buying food and clothes. Being middle class is more than just a social standing; it is a way of life. It may well take a generation or two of being middle class to adopt a purchasing pattern that is not so focused on basic needs. One's degree of class stability then appears to impact one's valuation of technology as an item that one can afford.

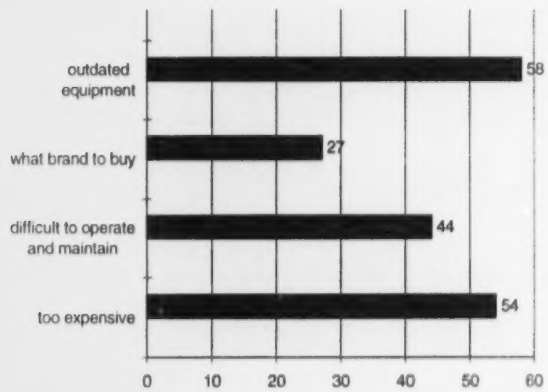

Figure 3. Obstacles to computer ownership (n =70).

An overwhelming majority of participants were also confused about what sort of computer they should buy and what all of the components would do for them. Sean, a financial consultant in his early 30s, suggested that purchasing a computer is a little like buying a car: salespeople are always trying to sell you more than you need. Joe, a letter carrier with two children, expressed concern over "sorting all the options," since there are so many computer brands from which to choose. Once the computer was purchased, they feared that it would be immediately outdated. As Paul, a hotel salesperson in his late 30s, suggested, "A year down the line, your [computer] has been upgraded, and now you're a step back. Now you have to do a lot more upgrading." There was a grave concern among many participants that such a considerable monetary investment is hard to justify given the brief half-life of computer technology.

Advantages and Disadvantages of Computer Ownership

Focus group participants articulated a long list of benefits and drawbacks to owning a computer, as Figures 4 and 5 show. While it is difficult to assess the relative merits of their concerns, it does appear that substantial obstacles exist that currently override the benefits of owning a home computer. Whether it be anxiety over pornographic content on the Internet or settled reliance on what are perceived as more credible and relevant media outlets, such as newspapers and television, important factors stymie families in their desire to remain "up to date" with society.

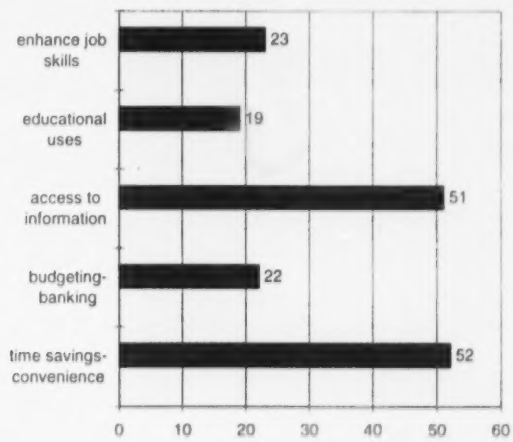

Figure 4. Benefits of computer ownership (n = 64).

The advantages ranged from the imminently practical to the more abstract. On the more tangible side of things, 81% of participants said that computers would add convenience and enable them to organize their lives better. One participant, Amalia, was very interested in doing her banking via the computer: "I go for the convenience. I'm practical, and I think this would be very practical." Eighty percent of respondents also expressed the view that computers enable access to information. Of course, computers alone do not allow the delivery of content, unless the owner has also, say, purchased a modem and has subscribed to an online service (or has purchased CD-ROM material). This conflating of computers with the Internet was very common among participants. Many heads of household believed that buying computers would *eo ipso* enable access to content. Finally, others exclaimed that people need computer skills to be marketable in today's economy. As Joe stated, "I would think that [if] a teenage kid, Hispanic kid, knew how to work computers, I would say that he had a very good chance of getting employment."

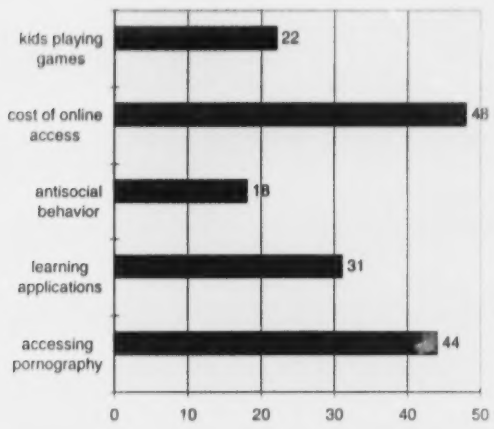

Figure 5. Drawbacks of computer ownership (n = 67).

On the downside, as Figure 5 reveals, parents were acutely concerned that their children would use the computer unwisely. For example, mothers of school-age children were particularly concerned that their children might be using the Internet at school to access pornographic material. When asked what concerned her about computers, Blanca, a housewife with three children, said that a computer "would be very beneficial to my kids. But I also worry about them getting a hold of pornography through the computer." Parents are also worried that their children, if left unsupervised, would spend all of their free time playing games on the computer rather than using it for educational purposes. What is more, a substantial number of respondents said that they believed that using the computer all the time made people antisocial. "People spend a lot of time on the computer," said Elea, a homemaker with two children. "They isolate, you know. What happened to the social? People are getting married to the computer." Being glued to the computer rather than spending time with family was a genuine concern.

Many of the disadvantages of computer ownership relate to the actual cost of online access as well as the steep learning curve necessary to master new applications. Many participants also said they did not know how to use a lot of the software applications and wanted to take a course or get help from their children. Notwithstanding the canard that operating computer applications is easy, many people continue to feel intimidated and apprehensive, because they feel that it is just too difficult to master this tool on their own.

Most focus group participants were not daunted by the difficulty of owning and operating a personal computer. While formidable barriers prevented respondents from purchasing a computer, many expressed an interest in taking computer courses to become more familiar with them. In Riverside, for example, parents of school-age children were very interested in taking computer classes, perhaps through the school, either before or after school hours. Others wanted a "nuts and bolts" class in what makes a computer and what the parts are called, not unlike knowing the parts of a car in order to become less fearful of what is under the hood. Many of the primarily Spanish-speaking, foreign-born interviewees did not have the experience with computers, either directly or indirectly (i.e., by way of neighbors, family members, or work associates), that establishes a culture of use.

Information Seeking, Media Habits

The number of avenues through which people can gather information and communicate with others has multiplied in recent years (Neumann, 1991). It is not uncommon today to see people in cars and shopping centers talking on portable phones or using their laptop computers on the plane or in the park. While new media (such as the Internet) are woven into the fabric of everyday life, most people remain reliant on the mass media and close associates, family, and friends for credible information.

Among our Hispanic middle-class respondents, there is a strong reliance on television, radio, and newspapers as dependable sources of information and news. Television, for example, substitutes for first-hand and direct experience, allowing viewers to share information and experiences (Meyrowitz, 1985). This said, people say they want information on any subject in which they have interest whenever they want it—a capability traditional media do not allow. With broadcast television, viewers must adjust their schedule to the time when a program is being aired. With newspapers, subscribers are limited to the content that is provided. With the Internet, of course, stored data, audio and video, can be retrieved and viewed when it is convenient for the end user. This freedom appeals to people, while they nevertheless remain comfortable with more traditional media.

Most respondents did not have a great familiarity with the Internet, although there was the sense among several participants that it was like a

librarian to whom questions could be posed and answers given. Of course, a host of searches can be performed on the Internet on an array of topics, but the successfully retrieved content may or may not be what one is looking for and may or may not be accurate. Unlike the librarian, the Internet cannot discriminate as to the content downloaded or assess a patron's needs.

Many focus group participants evinced a strong trust in print media, such as books, magazines, and newspapers. When it came to "authoritative" sources for educational materials for their children or information for themselves (e.g., legal, tax, "how to"), most believed that a trip to the library, bookstore, or museum was the best course of action. Respondents were asked where they would turn if their child needed to find out more information on dinosaurs, and a majority said, without hesitating, that they would take their child to the library, to the museum, or buy them a book. A few participants also said they would take their children to see *The Lost World.* The Internet was rarely mentioned as respondents' medium of choice.

Print media and the personality-driven television are not only seen as more credible alternatives than the Internet, they are also what people are used to. When asked how they would feel about newspapers going online, Daniel, an assistant manager for a sports-related business, said "I would rather have it in paper. It's just a natural thing with everybody." And Hortencia, a service contractor with two kids, suggested similarly that part of her daily ritual involved the newspaper: "In the morning, I get the paper and glance at it and get coffee and out the door. I would not have time to log into a computer. . . ." The print media are viewed as more credible sources of information, such as most of the materials one is likely to obtain in a library. As Sean suggests, "I love reading, and I find that technical information is more thorough through magazines, newspapers, articles. If you have the specific subject, then usually the written materials are more informative, more descriptive."

These media habits, coupled with the "ritual" that governs many people's lives—glancing at the paper in the morning and scanning the evening news before bed—suggest that the Internet would require adjustments in the way media are perceived and how people go about their lives. As long as people are more comfortable with their daily newspaper and nightly media personalities, then the Internet may not be the medium of choice for information and news for many, unless the delivery of content is made more relevant to the lives of Hispanic consumers. Will there soon be Internet personalities, for example, who can help guide people through the vast wilderness that is online information retrieval?

Exposure to Computers

Earlier it was suggested that the more heads of household experience computers, the more likely they are to purchase them for their own personal home use. Taking computer classes, using a computer in the workplace, or visiting one's child in the school computer lab probably make parents more likely to want one for their family. Many of the anxieties that people have about computers, such as fear of addiction to computer games and online chat groups, may be overcome if parents actually gain exposure to computers themselves.

Most respondents who lived in Orange County, whose average income was in the $40,000 to $50,000 range, have been exposed to computers, either in the workplace or at a family member's house. These experiences seem to increase the probability that they will invest in a computer in the near future. The Spanish-speaking, foreign-born respondents tended to have less exposure to computers. While their enthusiasm for computers was considerable, their limited experience made them less assured about their prospects of purchasing a computer.

Hispanics have less experience with computers in school, in the workplace, and at home, which means that use patterns have not been fully developed. As experience with and exposure to computers increase, we can most likely expect that anxiety, fear, and apprehension vis-à-vis computer technology will also diminish, just as anxiety about cars is less pronounced among those who can change oil and fix a flat tire. As they become imbedded in everyday life, computers will become second nature to prospective users.

Social and Political Issues

When asked who should be responsible for ensuring that all school children gain access to computers in public schools, most heads of household believed that the government (taxpayers) should subsidize Internet access. Many believed that public schools should be access

points to which low-income people can come who do not own a computer. As Leonard, a paralegal and property manager, put it, "I think it should be a combination of the government and the manufacturers to make [computers] accessible to schools, libraries, and all teaching institutions. I think both should play a part financially and technologically." Ron, a Department of Motor Vehicles (DMV) field representative with two kids, stressed that "in a perfect world, everybody would have the money to pay for computer access, but there are some schools that just cannot afford it; they need extra help."

Participants saw subsidizing access as providing benefits not only to students but to government and industry as well. As Hortencia emphasized, "the government . . . wants the kids to come out of high school and be computer knowledgeable, but if they don't give them the proper tools, then they are not going to do it." Similarly, one participant said that "I think if the computer company wanted to make profits, they would make their computers accessible to young people. . . . A person is going to be familiar with that computer and in the future he will buy one."

Of the crucial issues facing the Hispanic community, such as education, jobs, and public safety, information technology did not come up as a major issue independent of the other issues. For example, Joe, a letter carrier, said that "we [Hispanics] have to be educated in the technology to compete . . . otherwise, we are gonna be out doing the unskilled jobs." Thus, computer literacy is tied to educational opportunity and economic progress. In short, technology is seen as a tool or a means to achieve certain ends, such as better results in school and better jobs. When viewed in this light, the terms technology and computer are converted to something more concrete, that is, the quality of life of one's family.

Recommendations

Focus group participants were asked to brainstorm ways in which Hispanics could become more interested in and gain greater access to computers. It was already suggested that sound public policy can lead to increased access to computers. Subsidizing low-income access to advanced telecommunications services and providing students high-quality exposure to computers in public schools are healthy starts. Additional recommendations include the following. First, there is a need for greater experience with and exposure to computers through adult classes in schools, churches, and community centers. Respondents suggested that they needed to become more knowledgeable about the "nuts and bolts" of how a computer works, its parts, as well as its important applications. Before- and after-school mentor programs were discussed as possible venues for these lifelong learning classes, as well as via community centers and church-sponsored events, so that adults as well as children can develop the skills they need to be employable in today's society.

Second, a "consumer report" in Spanish is needed of the best brands and types of hardware and software, presented in a format that is relevant to potential Hispanic consumers. There was a great deal of consternation among participants over sorting out what the best computer was to meet their needs. Many people were worried that buying a computer was a little like purchasing an automobile: salespeople were always trying to sell more than the consumer needed. According to many heads of household, a guide for consumers, published regularly, would appease their fears about the appropriate equipment to meet their family's needs. Personal testimonies and recommendations from familiar personalities in the community might help consumers trying to sort out who to trust when they go to purchase computers.

Third, advertisements in community as well as ethnic media are necessary. A majority of the middle-class Hispanics with whom we talked suggested that the advertising they saw made them more likely to want to purchase a computer. However, there was a consensus that computer ads were fairly infrequent on Spanish-language community and ethnic media. Among those who are primarily English-speaking, community media, such as local cable providers, are appropriate channels for advertising to local audiences.

Finally, media literacy and critical thinking skills are required to navigate the Internet. A not-so-uncommon perception of the Internet among those whom we interviewed was that it provided answers to questions that end users or subscribers pose. It was analogized to a librarian who responds to a patron's needs by directing him or her to the appropriate source. Of course, the Internet is unlike the library in that the information retrieved by using a search engine may or may not be useful and

accurate. It takes media literacy, background knowledge, and critical thinking skills to navigate the loads of information that the Internet can provide. Along with the "nuts and bolts" classes, adults need to learn to navigate the Internet—a sort of driver's-ed course—so as to best help themselves and their children learn.

Conclusion

It was stated in the opening lines of this paper that the technology gap has not been well diagnosed. While income inequality between Hispanics and Anglos is usually considered to be the principal reason for the disparity in computer ownership, the findings reported here point to factors beyond one's economic capacity that may well explain the gap. These characteristics may not be unique to Latinos (since we did not conduct focus groups on Anglos similarly situated), but the following patterns prevail among the Hispanics whom we interviewed.

The direct or indirect experience with and exposure to computers may well impact the extent to which middle-income Hispanic householders are ready to purchase a computer for themselves and their families. Spanish-speaking participants and recent immigrants emerge from a background in which there is little or no direct experience with computers. They have very few if any relatives, neighbors, and co-workers who use computers; thus, their anxiety and fear about computers is not mitigated. Those members of the Hispanic middle class who do not speak Spanish and who have had a comfortable income for at least a generation now use computers in the workplace and have friends, family members, and neighbors who have bought computers. It may well be the case, however, that patterns of use are more firmly rooted in Anglo households where ownership and use rates in all walks of life are higher than among Hispanics.

In addition, it may be the case that the length of time one has been in the middle class affects one's attitudes toward technology. Those heads of household who have only recently gained middle-class status may very well carry over their concern with meeting basic needs; thus, their purchasing priorities are less attuned to the acquisition of computer technology.

Lack of familiarity, exposure, and direct experience with computers among Hispanic parents manifests itself in feelings of anxiety, apprehension, and fear over the role computers play in the lives of their children. Concerns over pornography, playing games rather than working, and the potential for social isolation reflect a lack of confidence and control over the technology. As patterns of use settle in and parents become aware of how computers can be harnessed to benefit themselves and their families, this anxiety will likely be alleviated.

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exceptionality

Whether gifted or differently-abled, children and families with special needs and abilities are finding that the new technologies offer great potential for improving family life and educational opportunities. In this section, college planning for gifted students (Sandra L. Berger) and easing the extra effort involved in individualizing instruction while sharing accountability with parents (Donald F. Rubovits and Jay F. Mulberry) are discussed. The use of technology to support individualizing our work with children and families was also the topic of the following papers not included here but presented in this strand at the conference:

Sandra Berger, *Constructing New Realities*
Janet Peters, *The Positive Aspects of Internet Experiences*
Elaine Robey, *Applications of Technology to Promote Literacy*
Joan Smutney, *Technology and Its Impact upon Gifted Children*

Common themes in this strand included the power of technology to individualize educational experience and its ability to enhance educational and social opportunities for children with varying abilities and needs.

College Planning for Gifted Students

Sandra L. Berger ■

Abstract

College planning is a major event in the lives of many families. For gifted students, college planning should be one step in a life development process that takes place between 7th and 12th grades. Characteristics of gifted students that affect their college planning include multipotentiality, sensitivity to competing expectations, uneven development, ownership of their abilities, dissonance, taking risks, and a sense of urgency. To help resolve the problems encountered by gifted students, the following areas might be considered: self-exploration, academic planning, effective work/study skills and time management, decision-making skills, intellectual and social/emotional enrichment, and learning about colleges. Learning about colleges involves seven steps: (1) gathering information, (2) planning and choosing, (3) making two visits, (4) applying, (5) interviewing and writing an essay, (6) applying for financial aid, and (7) making acceptance decisions. The application process can be looked on from two points of view—that of the gifted student and that of the admissions officer. Admissions officers look at the academic rigor of the student's high school program; standardized test scores, including Subject Test results; extracurricular activities; and community service. Some schools also require an interview and an essay. Persuading a college or university to choose them requires students to know how to present themselves so that an institution will recognize them as a good match. Part of that presentation is based on what they know about themselves; part involves what they learn about how colleges make selections.

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Introduction

College planning is a major event in the lives of many families. For many students, the college-planning process is a finite event that begins and ends arbitrarily and abruptly. The onset of this process is typically participation in the National Merit Scholarship Program during 11th grade. The ending is marked by the receipt of a letter from the schools selected by the students, typically during the second semester of the student's senior year in high school.

Between these benchmarks, students must select colleges they want to attend, participate in a number of standardized achievement tests, and submit applications. For many students, the information they are able to gather during the 11th grade and the 12th grade is sufficient to make decisions. For gifted students, however, a much longer process is often typical. They are concerned about and begin planning for college as early as 7th grade. They tend to make short mental lists that swing from one extreme to another: "brand name" colleges, such as Harvard, Yale, Princeton, and Stanford, and popular state or community colleges. With each school year, their "angst" increases. For gifted students, because of their characteristics, college planning should be one step in a life development process that takes place between 7th and 12th grades.

What Characteristics of Gifted Students May Affect College Planning?

Multipotentiality

Multipotentiality is the ability to develop a wide variety of aptitudes, interests, and skills to a high level of proficiency. Many of these students have heard over and over again: "You can be anything you want." But that ability is precisely the problem. These students are highly capable and participate in a variety of activities. Their calendars present an intimidating display of appointment dates and times.

Parents anxiously await the day their children will get a driver's license. Many of these adolescents wonder how they will be able to make college and career plans when, on the surface, they like everything and are good at everything.

On vocational exploration tests, these youngsters often show a high, flat profile; that is, high aptitudes, abilities, and interests in every area. For example, Betsy is a multipotential gifted student. As a high school senior, she had boundless enthusiasm for everything and an endless supply of energy. Her interests included psychology, creative writing, language, physics, chemistry, jewelry making, fencing, bicycling, nature, science fiction and "people." The lead cross-country runner in her senior class, she also topped the class in college aptitude tests and the advanced placement English examination. She had a strong desire to be of service to humanity, and she wanted to master 12 languages before she turned 40.

Vocational preference tests are of little value to students like Betsy because they cannot help them discover what they are unable to do. In addition, they provide only limited insight into the exact content of different fields. How does Betsy begin to make a career choice? Students like her experience vocational selection as an existential dilemma. They are as concerned about the road not taken as they are with finding the "right" path. Choosing to be a linguist means giving up a career as a physicist. Furthermore, carried into the college setting, an attempt to participate in everything may create a destructive academic and emotional environment for her.

Early emergers and late bloomers. Some multipotential youngsters fall into one of two career-planning groups: early emergers, who select careers at a very early age, or late bloomers, who delay career selection well into adulthood. Some early emergers select careers early in life out of what might be termed a "calling" or sense of mission (e.g., musicians and dancers). Others seem to arbitrarily select a career at a very young age, perhaps to avoid dealing with the overwhelming multitude of career options available to them. Having too many choices can be threatening. Some gifted people do not find their calling until midlife. They may move from job to job or have several careers in their lives.

Voltaire's apt observation that anything is better than boredom is a creed for these gifted students. In order for them to be happy with their work, they must be constantly learning. When they have learned all that they can or want to learn in one position, it is time to move on to new challenges. For both these groups, college and career planning must be structured around the concept of choice and multiple options. Students should understand that career decisions are not irreversible, and they should set broad long-term goals. Ultimately, many of these students will "invent" their careers; they will make choices that are either interdisciplinary or not available during high school because the state of the art has not sufficiently progressed.

Sensitivity to Competing Expectations

Sensitivity and receptivity are great assets, and they permit a student to be receptive to imaginative, creative ideas. Like multipotentiality, however, these characteristics can be a mixed blessing when students plan for college and a career. Heightened sensitivity is often accompanied by heightened vulnerability to criticism, suggestions, and emotional appeals from others. Often, others' expectations for talented young people compete with their own dreams and plans. Delisle (1982) in particular has pointed out that the "pull" of an adolescent's own expectations must swim against the strong current posed by the "push" of others' desires and demands.

Parents, relatives, friends, siblings, teachers—all well-intentioned—are eager to add their own expectations and observations to the bright students' intentions and goals. The dilemma is complicated by the numerous options within the reach of a highly talented student: the greater the talent, the greater the expectations and outside interference (Kerr, 1990).

Uneven Development

Many researchers, counselors, educators, and parents are aware that, in general, the gifted student's level of social and emotional maturation may not keep pace with his or her advanced intellectual development (Buescher, 1985; Kerr, 1981; Manaster & Powell, 1983; Silverman, 1993a, 1993b, 1993c). They may find it difficult to set long-term goals.

Highly gifted students often have difficulty finding others like themselves. Consequently, it should not be surprising that establishing social relationships,

a skill that is acquired through peer contact, may not be developed to the same degree as their intellect. Furthermore, their predisposition toward intellectual growth may actually get in the way of social and emotional development. Some emotionally immature students may be significantly lacking in perspective and objectivity. They may think abstractly but be totally unreflective (Buescher, 1985). These traits may compound the difficulty in making decisions and setting long-term goals. According to one counselor interviewed, the students see these inconsistencies in themselves and feel frustrated, but they do not know what to do. They need help in sorting out which aspects of their lives they can control and which they cannot.

Ownership

Talented adolescents simultaneously "own" and yet question the validity and reality of the abilities they possess. Some researchers (Olszewski, Kulieke, & Willis, 1987) have identified patterns of disbelief, doubt, and lack of self-esteem among older students and adults: the so-called "impostor syndrome" described by many talented individuals. While talents have been recognized in many cases at an early age, doubts about the accuracy of identification and the objectivity of parents or favorite teachers linger (Galbraith & Delisle, 1996). The power of peer pressure toward conformity, coupled with any adolescent's wavering sense of being predictable or intact, can lead to the denial of even the most outstanding ability. They may have difficulty owning their abilities because often it is subtly implied that they belong to parents, teachers, and society. The conflict that ensues, whether mild or acute, needs to be resolved by gaining a more mature "ownership" and responsibility for the identified talent.

Dissonance

By their own admission, talented adolescents are often perfectionists. They have learned to set high standards and often to expect to do more and be more than their abilities might allow. Childhood desires to do demanding tasks perfectly become compounded during adolescence. It is not uncommon for talented adolescents to experience real dissonance between what is actually done and how well they expected it to be accomplished (Buescher, 1991). Often the dissonance perceived by young people is far greater than most parents or teachers realize and affects their willingness to take intellectual risks.

Taking Risks

While risk taking has been used to characterize younger gifted and talented children, it ironically decreases with age, so that the bright adolescent is much less likely to take chances than others. Why the shift in risk-taking behaviors? Gifted adolescents appear to be more aware of the repercussions of certain activities, whether these are positive or negative. They have learned to measure the decided advantages and disadvantages of numerous opportunities and to weigh alternatives. Yet this feigned agility too often leads them to reject even those acceptable activities that carry some risk—for example, advanced placement courses, stiff competitions, public presentations—where high success is less predictable and lower standards of performance less acceptable in their eyes.

A Sense of Urgency

The director of a regional talent search program described the way some gifted students react when they think about college planning: "Part of being bright is feeling you have to have closure on any kind of decision process . . . . [Some gifted students believe] 'if I sit down today and think about what college I'm going to go to, tonight I have to know'" (T. Buescher, personal communication, August 1987). Some gifted students are eager to find solutions for difficult questions and are inclined to make difficult but immediate decisions about complex problems. Their impatience with a lack of clear-cut answers, options, or decisions drives them to seek answers where none readily exist, relying on an informing, though immature, sense of wisdom (Buescher, 1987). The anger and disappointment when hasty conclusions fail can be difficult to cope with, particularly when less capable peers gloat about these failures.

What Options Might Resolve the Problems Encountered by Students?

Learning about Oneself

The years from the beginning of 7th grade to the end of 12th grade are turbulent times for gifted adolescents. During this critical period, these students need to identify their strengths, develop accurate and realistic self-concepts, use their talents in constructive, satisfying ways, and develop an appreciation for community. Guidance

counselors and parents can assist by understanding the complexity of the task and providing information, resources, support, and encouragement.

During middle school and the early years of high school, self-assessment inventories and appropriate career development strategies can assist students in learning about themselves. These inventories and strategies should be selected to match the unique characteristics of the students. An academic plan, effective work-study habits, a time-management system, and decision-making skills will assist students to establish a sense of direction and set realistic goals. Teachers can provide instruction in effective writing skills to assist students in clarifying thoughts and discovering the meaning of their experiences. Involvement in community life can provide a sense of personal satisfaction. Exposure to a broad range of academic subjects, intellectual ideas, and social situations assists students in learning about themselves through a variety of experiences.

Career exploration, a self-discovery process, will help students understand the relationship between school and careers, become familiar with realistic career options, set short- and long-term goals, and plan for the future. Since many of these students will invent careers, the help they receive from school and home should be open-ended and sensitive to the conflicts experienced from others' expectations.

Academic Planning

Some gifted students will be attracted to highly selective colleges—schools that reject more applications than they accept. The most selective colleges look for evidence of high student motivation and achievement—good grades in very demanding courses. They expect to see Advanced Placement (AP) courses on the student's transcript, if provided by the high school. Planning for advanced courses must begin as early as the 8th or 9th grade, especially in the case of sequential courses such as mathematics, because the progression to AP calculus requires several years of prerequisite courses, beginning with algebra. The same kind of planning is necessary for languages and sciences. Some students will not be ready or able to begin a mathematics, language, or science sequence by 8th grade. In such cases, courses offered in summer or correspondence courses sponsored by regional talent search programs may be a viable option.

Effective Work/Study Skills and Time Management

Most gifted students are able to interpret and define meanings far in advance of their age-mates. School is relatively easy for them until 7th grade (or even beyond). There has been no need to learn to study effectively or manage time wisely. These students often underestimate how much time will be needed to do homework in a demanding program. When truly challenged late in high school or college, they may discover that they do not have the skills needed to organize, study, and produce high-quality work. By high school, students should be taught the "habits of mind" required by careers in the sciences, humanities, and other fields. A problem-based approach is frequently the most successful method of teaching study skills.

Decision-Making Skills

Decision-making research emphasizes convergent thinking skills such as careful evaluation of data, rational evaluation of alternative solutions, making judgments, and testing solutions (Kolb, 1983; Maker, 1982). These skills are second nature to some gifted students, but they need to be taught to others. One highly flexible model that works well with gifted adolescents is the Creative Problem-Solving (CPS) Model (Parnes, 1975).

In college planning, good decisions require good decision-making skills and good information. When the number of options are infinite, the following can provide some structure:

- Know something about himself or herself; be able to use personal experiences to set personal goals.
- Recognize and define the decision to be made: school courses to take, how to select a college academic major, colleges or universities to consider.
- Assess and evaluate the information obtained.
- Assess the information by asking: "What facts and ideas are missing?"
- Generate strategies to acquire additional information.
- Gather additional information, facts, and ideas related to the goal.

- Assess the advantages, disadvantages, and consequences (risks and costs) of each alternative.
- Develop a plan or strategy to obtain the desired goal.
- Review the outcome. If it does not make sense, begin again.
- Distinguish between decisions and outcomes. (Good decisions can have poor outcomes, and vice versa.)

Intellectual and Social/Emotional Enrichment

Understanding oneself depends, in part, on one's breadth and depth of experience. Gifted adolescents need to discover, explore, investigate, and participate in different types of activities, intellectual ideas, academic disciplines, extracurricular activities, and social relationships. The nature of the activity chosen depends, in large part, on the characteristics and needs of the student.

There are many ways a gifted student can explore a broad range of intellectual ideas, acquire depth of knowledge in an area of interest, socialize with intellectual and age-mate peers, and, in some cases, find mentors. Some needs can be met by activities planned by a family, some can be met by courses offered by the school system, and some require extensive investigation of available supplemental programs. If a family or guidance counselor decides that a student will benefit from supplemental programs, then university-based programs, regional talent search programs, and a variety of summer programs offer enrichment or acceleration.

Learning about Colleges

Learning about colleges is the second part of a broad-based approach to planning for college, designing career goals, and, ultimately, leading a personally satisfying life. The process can be organized into seven steps:

- Gathering information
- Planning and choosing
- Two visits
- Application
- Interview and essay
- Financial aid
- Decisions

Students can gather information by reading guidebooks and using multimedia resources, talking with people, and visiting colleges. A recent survey conducted by one college indicated that 49% of their 1996 freshman class obtained most of their information from the Internet. Even if this statistic was exaggerated, it is quite likely that students use the Internet as a major resource for gathering information. Students can design criteria that describe a college they might like to attend, and they can use one of the college-planning search engines to find schools that match their criteria. One of these sites provides a list that includes schools that match the student's credentials, schools where the student will almost definitely be accepted, and some schools that are slightly beyond the student's reach in terms of standardized test scores and other objective data.

Students can visit any one of many sites that provide an opportunity to take the SAT or ACT online. One site analyzes the student's answer sheet and provides feedback on how the student might raise scores. The Princeton Review, a major college-planning publisher, offers a "virtual nag" called "Remind-o-Rama." Students receive e-mail messages when important college-planning deadlines approach. Most colleges have a "home page," and provide online school tours. Tasks that once required hours in the library can be accomplished efficiently from a home or school computer. Where college planning is concerned, technology has made a significant difference. The appendix to this paper provides a list of college-planning sites on the World Wide Web.

By the end of 11th grade, students should be able to develop a list of 10 to 20 colleges based on personal criteria. To accomplish this objective, they need to learn about the different types of schools and their offerings, plan and choose the types of schools to visit, understand the type of information that can be obtained in a visit, develop an initial understanding of how schools select a freshman class, learn how to match their credentials to school offerings, decide which schools should be visited a second time, and learn to analyze and evaluate the information that was gathered. As students and their families begin to collect information about colleges, the following guiding questions can provide some structure:

- How do I want to live for the next 2 to 4 years?

- What are the different types of postsecondary education and how do schools differ in their offerings?
- What shall I look for during a campus visit?
- How does a college evaluate applications and choose a freshman class?
- What do I have that colleges want?

By the middle of 12th grade, students should be able to narrow their lists to five or six colleges by evaluating information about college offerings and the method used by colleges to select a freshman class. Reading college catalogs that describe the courses offered can help students assess a school's distribution requirements, the kinds of courses taught, and the sizes of various academic departments. A second visit to some schools can provide a taste of college life if the student stays in a dorm, and it can provide opportunities to meet with faculty members in areas where students might concentrate (e.g., an academic discipline, music, or art). The final list should reflect (a) personal values, interests, and needs; (b) the variety and range of available college opportunities; (c) realistic constraints such as cost and distance; and (d) five or six colleges that are appropriate. The group should include a "safety" school where the student will definitely be accepted, a "long shot" where admissions criteria are slightly beyond the student's credentials, and three or four colleges where admissions criteria match the student's credentials.

Students should understand that there is no such thing as the perfect school. The college experience, like life, is a series of trade-offs. Most gifted students should be able to identify several different types of schools appropriate for them. This does not mean that they would have identical experiences at each school, only that their experiences would be equally positive. Everyone should keep in mind that students respond differently to the increased independence of college. Some students who earned high grades in high school (a highly structured environment) continue to do well in college. But others have a difficult time with unexpected challenges. Some students who do not do well academically in high school are highly successful in college, in part because of a different structural organization than is provided by the average public high school.

The following guiding questions can provide some structure for 12th grade:

- How do I complete an error-free application?
- How can I effectively present my credentials?
- How can I secure strong recommendations?
- How shall I use the interview to my advantage?
- How do I write an effective essay?
- How can I pay for college?

Counselors, teachers, and parents are often surprised that gifted students have not matured as expected by their senior year in high school and that students' uneven developmental patterns and characteristics have complicated college planning. Despite everyone's best effort, the students may procrastinate until the 11th hour. Some counselors, familiar with the effort required to persuade these students to send for college applications, adjust their calendars to accommodate the last-minute paperwork. Teachers wonder how they will cover the required curriculum and assist students with writing the essay portion of the application. Parents become impatient as they realize the complexity of the application process and how little it resembles their own experiences. Parents may urge students to make an arbitrary decision based on cost or apply to colleges previously attended by family members.

Some gifted students may suddenly decide to accelerate and apply to college prior to senior year. Guidance counselors, teachers, and parents should assess the student's ability to live away from the family, establish social relationships in college, and set long-term goals to determine whether or not the student is emotionally as well as intellectually ready for college. Paula Olszewski-Kubilius (1995, 1997) indicated in a recent summary of research about early entrants that, academically, the evidence is overwhelmingly positive. Compared to typical freshmen, their grade point averages are higher and they are more likely to complete college. She also indicated that much knowledge has been gained about the conditions necessary for early entrance students to succeed.

The Application Process

The final step, the application process, can be looked on from two points of view: that of the multipotential gifted student, who may be able to make rational choices but whose options are

infinite; and that of the admissions officer, who may have to select the freshman class from a wide range of highly qualified applicants. The way the student addresses the application process may be the critical factor determining acceptance or rejection. The earlier information about this process is available, the better the student and his or her family and guidance counselor can plan an application strategy. (This does not mean gifted students should plan high school courses and extracurricular activities just to conform with college admissions policies.)

Two kinds of information are required on the typical application:

- Objective information including biographical data, information on academic performance, standardized test scores, AP exam grades, and so forth.
- Subjective information including extracurricular activities, recommendations, essay or personal statement, and a personal interview.

When academic credentials are roughly equal, subjective information and the method of presentation become deciding factors. (Sometimes geographic location or ethnic origin can tip the balance in favor of or against acceptance.) Recommendations might also make a difference if they have been written by individuals who know the student quite well. Students should obtain recommendations from adult leaders of special programs in which they participate during 9th, 10th, and 11th grades and file them for possible later use. Transcripts from out-of-school courses should be obtained and placed in the student's file along with course descriptions.

Colleges look favorably upon transcripts showing increasing academic rigor during 4 years of high school. An atypical course or low grade in an academic course should be accompanied by an explanation, particularly if it occurs during 11th or 12th grade. A period of illness during which a student falls behind and receives a poor or failing grade is a good example. Explanations are also useful if a student encounters family problems, overcomes difficulties, or maintains grades in spite of difficulties. Address these situations in an essay or personal statement.

Depth and scope of extracurricular activity are preferred to a "laundry list." Examples of initiative, leadership ability, and community service are particularly welcome. Documentation of activities may be critical. Students may, for example, enter a contest, submit work for publication, keep a scientific journal, or keep a notebook of artistic works.

The parts of the application should fit together to provide a common theme. Recommendations should support and be consistent with both the academic record and what the student says about himself or herself. For example, high test scores and a relatively low grade point average (GPA) provide an inconsistent picture and may suggest a problem (e.g., high ability but low motivation) to an admissions officer.

If a gifted student suddenly decides to apply to a particular college at the "eleventh hour," the Common Application, available online at http://www.nassp.org/services/commapp.htm, may suffice. If completing a written or typed application is a challenge, investigate MacApply, College Link, or other computerized methods of completing an application.

How Candidates Are Evaluated

Admissions offices at highly selective colleges or universities may read 40 applications a day, spending no more than 5 or 10 minutes looking at an application during the first reading. In some instances, initial reviews are performed by computers programmed to eliminate students who do not meet specific numerical criteria. This process is a distinct disadvantage to a gifted student whose academic credentials—GPA, class rank, or standardized test scores—are not reflective of the student's ability and potential. The admissions officer may look at the name of the student's school district to see if he is familiar with the quality of the education provided, then at the secondary or high school profile, and finally the student's academic performance. He follows this pattern because when a college accepts a student it gambles on the student's chances of succeeding. A student who performs consistently well all through high school is a much lower risk than one whose performance has been erratic. Even though a student's record may identify him or her as gifted (or enrolled in a special program), colleges will evaluate the student's credentials in the same manner as those of all other students.

Academic Rigor. Is there evidence of superior ability such as honors, gifted or talents (GT), or AP

courses? (Some colleges ignore honors or GT classes because they are of unknown quality.) Students should be alert to the difference between state academic requirements for high school graduation and requirements for admission to a selective college. Does the transcript reflect depth in areas such as foreign languages and mathematics? (Studying one language for 6 years is better than two languages for 3 years.) Does the transcript reflect quality? Did the student take four or five major subjects each year (English, mathematics, science, history, language) or a variety of nonacademic or elective courses (e.g., business law, fashion merchandising, gourmet foods, study hall)? If a high school does not include course descriptions with college applications and course titles do not accurately reflect quality, the student or counselor should attach an explanation to the transcript. Does the transcript reflect balance? Did the student take a broad curriculum (mathematics and science, history, and English courses) or concentrate too heavily in one area? And finally, does the transcript reflect a stable or upward trend? Are the student's grades improving or growing weaker each year? Recent performance is the most important indicator of current level of ability and motivation.

The most selective colleges are interested in evidence of high motivation and achievement—that is, high grades in very demanding courses. AP courses demonstrate that the student is capable of performing at a high level of academic proficiency. Results of AP examinations may result in advanced placement, credit, or both in college. If a student chooses not to take AP examinations, a high grade in an AP course is still considered evidence of superior ability. It is the student's responsibility—not the high school's—to see that AP scores and transcripts are sent to colleges. AP grades of 3, 4, or 5 may be accepted for exemption from required freshman courses or granting of college credit. Check a school's AP policy. Do not assume receipt of transcript credit.

Standardized Test Scores. Standardized test scores (e.g., PSAT, SAT, ACT) supplement transcripts and permit an admissions officer to compare applicants against a similar standard. The tests share a common characteristic: they are timed, primarily multiple-choice tests. Colleges vary in their use of standardized test scores. Some believe the scores predict college grades and use them as one criterion for admission decisions. Others place primary emphasis on high school academic achievement and AP and Subject Test scores, then look at subjective information such as the essay. Some large universities screen a vast number of applicants by combining each student's SAT or ACT score with GPA and class rank. They may accept or eliminate applicants strictly on the basis of these numerical scores. Students whose standardized test scores are not outstanding should understand this system so they can select appropriate matches. Students should ask how scores are used.

Should gifted students prepare for the SAT-1 by taking a course? Yes, if the student's verbal and mathematical abilities are very uneven, or if a student experiences severe test anxiety. However, students should always take practice examinations to become familiar with the test structure and instructions. Since some gifted students hate to leave an answer blank, understanding the structure will allow them to make more informed decisions on when to guess. Furthermore, gifted students often find reasons why more than one answer could be correct. This trait may cause difficulty when the student has to choose exactly one correct answer.

SAT-II: Subject Tests. Subject Tests, designed to measure the extent and depth of a student's knowledge in a particular academic subject, are required by many colleges. Some schools believe Subject Test scores are better indicators of knowledge than other standardized test scores. Students should ask how scores are used.

Extracurricular Activities. Most selective colleges ask students to list, describe, and sometimes comment on the significance of their extracurricular activities. They are interested in depth of commitment, personal initiative, originality, leadership ability, and evidence of a social conscience. The list does not need to be exhaustive to have an impact. Membership in several organizations is less impressive than a major contribution to one. Well-rounded activities indicate interest in a variety of endeavors, but intense concentration in one, if well documented, or participation in an athletic endeavor accompanied by a statement regarding its significance is just as impressive.

Technology has introduced a new dimension to documenting extracurricular activities. An autobiographical videotape or compact disc can

illustrate skills and abilities. However, electronic media is effective only if it demonstrates an aspect of the ability that cannot be demonstrated in any other way and relates to the ability to perform in college. For example, Gregg is an expert windsurfer. The admissions office receives a professional-quality videotape showing Gregg successfully navigating his way through relatively difficult surf. Although interesting, the videotape will probably have little impact on the deliberations of the admissions committee. If, however, Gregg adds a narrative describing the way windsurfing relates to his interest in physics, he will provide necessary meaning to his interest and credentials. In sum, a videotape does not necessarily demonstrate the capacity to be original and creative; it is a means to an end rather than an end in itself.

Submitting material that provides evidence of talent can be tricky. Admissions officers are flooded with tapes, portfolios, and home-baked bread. Students should ask if a college will accept supplementary material and how they can best present extracurricular activities and special talents. Any method that demonstrates the ability to perform in college and adds substance and consistency to the application is desirable. Supporting material must appear as evidence, not testimony; it must be the best work, and needs to be short and to the point. Most importantly, it must add something to the application that cannot be illustrated in any other way, and demonstrate, in some way, the student's ability to succeed at the school.

Community Service. An altruistic student who has contributed to community life without regard for compensation is more likely to contribute to campus life, be academically successful, and form a long-term attachment to the college or university. Therefore, volunteer activities should be documented in the application. A good example is talent in a particular sport combined with coaching young children after school. Another example might be expertise in developing computer programs that was shared by writing programs that helped a social agency save money. Letters of recommendation from a supervisor or agency director or treasurer should be in the file.

The College Interview. Students need to learn how to use the interview. The standard advice offered by well-intentioned people is "Be yourself," but that is much too general for gifted students; they think of too many alternatives. Gifted students may focus on one factor, such as how to dress for the interview, and then respond by swinging from one extreme to another. An interview practice session in which students role-play an admissions officer and an applicant is an ideal way to demonstrate this part of the application process. Guidelines for an effective interview should never program a student to ask specific questions or answer questions in a specific way. Admissions officers recognize and value spontaneity. Students should decide which questions are important; they should be made aware that certain types of questions are valued by highly selective colleges.

The factors that are important to each student will determine the degree to which the college interview provides information that results in a match. For example, a student may ask "What are the most recent experiences your college has had in placing graduates in jobs, professional schools, or graduate schools?" If an admissions officer values that type of question and provides an adequate answer (one that goes beyond information provided in the guides), the student will acquire valuable information and the admissions officer will have insight into what this student wants from a college. Students should check to see if on-campus interviews are offered. Many colleges now ask local alumni to conduct interviews.

Before the interview, students should construct an agenda that asks questions that cannot be answered by reading catalogs. For example, ask what percentage of the freshman class returns for sophomore year, or, if students do not return, does the college know why. Do not ask how many books are in the library (there are more than you can read). Construct an agenda that will answer the personal question "What does this institution offer that will assist me in reaching my goals?" Answer the interviewer's questions honestly. Prepare and rehearse, but don't overprogram yourself. Be prepared to present information about yourself that is not visible in your written application and supporting material. Remember, the admissions committee is struggling to decide "Which of these highly qualified applicants shall we admit, and which must we deny?" Write down your interviewer's name; write a thank-you note as soon as you return home.

The College Application Essay. The essay is the bane of every high school senior's college application. Some students refuse to consider colleges

where they might be extremely happy because an essay is required. Some write their essays the night before the deadline; others spend weeks writing and rewriting. Only the deadline puts an end to the agony.

Students with prior experience in writing will find that an autobiographical essay is a growth-promoting experience—after they overcome the anxiety produced by a series of open-ended, sometimes deceptively challenging questions such as "Tell us something about yourself that is not reflected in your application folder" or "Discuss your academic and professional goals." A student may have earned straight A's in a highly rigorous academic program, earned more than adequate standardized test scores, have a social conscience, and participate in many community activities, but still feel uneasy at the thought of outlining his or her academic and professional goals. How does one "evaluate a personal or educational experience" that has been "a major factor" in one's getting old enough to apply to college? Highly analytical and other gifted students may ask what this question has to do with one's ability to succeed in and contribute to a school. The more competitive colleges, however, require essays, detailed written analyses of extracurricular activities, or personal statements. They are asking the question "Who are you?" Students should be instructed to answer all questions, but particularly the one that reads "What can you tell us about yourself that we have not asked?" Taking the time to write an answer may make the difference between acceptance and rejection.

The key to writing a personal essay or statement is the ability to organize, reflect, and write autobiographically. Some gifted students have a difficult time when asked to reflect. If the essay is to make a significant difference to an admissions officer, they need to know themselves and they need writing practice.

The essay can be a decisive factor. It can reassure the admissions committee that the student is capable of college-level work. Student essays should be reviewed by teachers, counselors, and parents for spelling and grammar; students should not be instructed on the essay topic. Colleges review the essay looking for many things: writing ability, intellectual curiosity, initiative and motivation, creativity, self-discipline, character, capacity for growth, leadership potential, community service, and consistency with other elements of the application.

What Students Need to Know

Persuading a college or university to choose them requires students to know how to present themselves so that an institution will recognize them as a good match. Part of that presentation is based on what they know about themselves; part involves what they learn about how colleges make selections. Students need to know (a) who is involved in the admissions process, (b) how students are evaluated, and (c) what they can offer that a college requires and desires—the ingredients the institution is looking for in a balanced student body. Many college-planning guides provide slick marketing tips for college applicants. But unless the match is truly a good one—and there is no way of knowing that without going through the kinds of activities proposed in this paper—both students and institutions are likely to be disappointed.

Students who can ask and begin to answer questions about themselves are on the road to developing self-awareness. When they can begin to ask and answer questions about colleges and relate those answers to themselves, they are prepared to begin the college selection process. Students "discover" themselves—that is, they identify personal values, aptitudes, and needs—and they learn how to conduct a college search through a multistep process. Ideally, this process should begin by 7th grade, with specific events occurring each subsequent year. However, the process can be shortened; it is never too late to begin.

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Acknowledgments

This paper is based on a book, *College Planning for Gifted Students,* by Sandra L. Berger, published by the Council for Exceptional Children, Reston, VA.

APPENDIX

College-Planning Internet Resources

Electronic Resources

Electronic resources have come of age. The Internet provides opportunities that have never before been available, and its presence has significantly increased both our vocabulary and approaches to gathering information for the college-planning process. The terms "Web site" and "http" have become a familiar part of our lexicon. One can hardly turn on the television or read a newspaper or magazine without coming across the term "home page." Throughout the United States, schools and public libraries are getting connected.

With a computer, a modem, and Internet access, counselors, educational professionals, parents, and students now have access to a wide variety of electronic college-planning resources. The rapid growth of the Internet brought with it the capability to take a practice SAT online, search for financial aid, and "see" a college without ever leaving home. Most colleges have home pages. Like viewbooks, these home-page views can be misleading. The information has been carefully developed to display the image that a school wants people to see and to portray the school in the best possible light. Students and adults must become critical consumers.

The Internet has also increased our capability to find a wealth of up-to-date college-planning resources. The following list of college-planning resources is relatively easy to use, and the resources offer several advantages.

Advantages of Internet Use

- Find a variety of ways to begin the college-planning process.
- Select a group of colleges that match your criteria.
- Get college admission office addresses and telephone numbers instantly.
- Get comprehensive information about the colleges you select.
- Send an online application.
- Search for financial aid availability.
- Access college major and career-planning information.

- Chat with other prospective applicants or alumni.

Note. Students should avoid using the Internet for sending last-minute electronic applications because of the risks. For example, a university's server might not be working, or heavy "traffic" might interfere with electronic transmission or even disable a university's server computer.

SAT and ACT Test Preparation

- ACT

ACT, Inc., is an independent, nonprofit organization that provides educational services to students and their parents, to high schools and colleges, and to professional associations and government agencies. They are best known for their college admissions testing program.

URL: http://www.act.org/

- The College Board

The College Board offers substantive information, test-taking tips, and sage advice about both the SAT-I and SAT-II, and others tests as well.

URL:
http://cbweb1.collegeboard.org/sat/html/students/prep000.html

- Educational Testing Service (ETS)

ETS Net is a gateway to information about college and graduate school admissions and placement tests, with links to AP, GRE, GMAT, LSAT, SAT, the Praxis Series, and TOEFL sites, as well as other educational resources. ETS Net provides sample test questions, test preparation, and test registration. It also contains information on ETS research initiatives, teacher certification, planning, financial aid, and links to college and university sites.

URL: http://www.ets.org/

- Princeton Review

Take an online SAT, check results and analyses of previous SATs, learn test-taking tricks, and much more. A career inventory is linked (http://cgi.review.com/birkman/birkman.cfm) to the Princeton Review for students who are thinking in that direction.

URL: http://www.review.com/college/

- Testprep

PSAT and SAT Prep is sponsored by Stanford Testing Systems, Inc. When users follow the instructions for taking a prep test, Stanford Testing Systems software will diagnose weak areas and provide specific questions to strengthen scores.

URL: http://www.testprep.com/index.html

College-Planning Internet Sites (This list is not intended to be comprehensive.)

- College Board Online

The College Board is a national membership association of schools and colleges whose aim is to facilitate the student transition to higher education. They offer information tailored to students, parents, and teachers. Users can register for and practice for SATs. Financial aid information is available. College Board's new ExPAN is an information and search service where you can use a variety of criteria to find the right college.

URL: http://www.collegeboard.org/

- College Choice Web site

This is a very comprehensive college-planning Web site hosted by the Graduate School of Education and Information Studies at UCLA. The information is categorized in an easy-to-use format, which makes it an ideal place to start.

URL: http://www.gseis.ucla.edu/mm/cc/home.html

- CollegeScape

A source of information about highly selective colleges and universities, this organization charges each college $1,500 when a student uses the online application, so the colleges listed are those that can afford to and want to pay a service fee.

URL: http://www.collegescape.com/

- College and University Home Pages

This site is a link to more than 3,000 college and university home pages.

URL:
http://www.gse.ucla.edu/mm/cc/links/schools.html

- The Consumer Information Center in Pueblo, Colorado

An informative publication, "Preparing Your Child for College," is available through the Internet from the electronic arm of the Government Document Distribution Center in Pueblo, Colorado.

URL: http://www.pueblo.gsa.gov

- Duke University Talent Identification Program (TIP)

TIP's college-planning pages include a wonderful FAQ titled "Dear Admissions Guru" that answers many common questions and a useful college search engine.

URL: http://www.jayi.com/ or
http://www.jayi.com/ACG/ques.html

- Go College

A commercial site that offers SAT practice tests on announced dates. They also offer simple and advanced searching for colleges that match the user's criteria and, for a fee, other services such as a searchable scholarship database.

URL: http://www.gocollege.com/

- Kaplan Education Center

This site, sponsored by Kaplan Test Preparation, provides a great deal of information about starting the college process. PSAT, SAT, and ACT information, and sample test questions are available, plus timely information on the college admissions process.

URL: http://www.kaplan.com/

- Lycos

Lycos is an index that lists college home pages by geographic location.

URL:
http://a2z.lycos.com/Education/College_Home_Pages/

- Petersons

Petersons is one of the most comprehensive college-planning sites. They have a search engine that allows the user to type in criteria and search for colleges that match. Financial aid information is included in their extensive offerings.

URL: http://www.petersons.com/

- Princeton Review

This site offers a search engine that lets you type criteria and then looks for schools that match. They also have a listing of "best" schools.

URL: http://www.review.com/college/

- The Texas Guaranteed Student Loan Corporation

Texas Guaranteed Student Loan Corporation is a public, nonprofit corporation that administers the Federal Family Education Loan Program (FFELP) in Texas. Its information includes career-planning and college selection information. The Internet site is titled Adventures in Education.

URL: http://www.tgslc.org

- USNews (school rankings by category, financial aid, and more)

URL: http://www4.usnews.com/usnews/edu/

- Yahoo's College Select (information on colleges and the college-planning process)

One of the large directories of information, Yahoo has an information page on Education and has additional pages with information about preparing for college and about paying for college. They also provide information about College Honors Programs.

URL: http://yahoo.com/Education/

URL:
http://www.yahoo.com/Education/Higher_Education/Honors_Programs

Financial Aid

- College Guides and Aid

This commercial site offers some free services, some services for a fee, and an online college-planning bookstore with book reviews.

URL: http://www.collegeguides.com/

- Counseling Resources

URL:
http://www.cybercom.com/~chuck/guide.html#B

- FastWEB

This commercial site offers an extensive searchable database of sources for financial aid, including work study, scholarships, fellowships, internships, grants, and loans. Their services are advertised as free.

URL: http://www.fastweb.com/

URL: http://web.studentservices.com/fastweb/

- The Financial Aid Information Page

This site is sponsored by the National Association of Student Financial Aid Administrators and has links to a wide selection of financial aid sources.

URL: http://www.finaid.org/

URL:
http://www.cs.cmu.edu/afs/cs/user/mkant/Public/FinAid/finaid.html

- The Illinois Student Aid Commission (ISAC):

The Illinois Student Aid Commission (ISAC) also provides information about preparing and paying for college.

URL: http://www.isac1.org

- The Student Loan Marketing Association (Sallie Mae):

The Student Loan Marketing Association (Sallie Mae) is a provider of financial services and operational support for higher education. Use the address below to access information offered by Sallie Mae on planning for college.

URL: http://www.salliemae.com

- U.S. Department of Education Office of Postsecondary Education

This site offers a student's guide and other useful information.

URL: http://www.ed.gov/offices/OPE/index.html

URL:
http://www.ed.gov/prog_info/SFA/StudentGuide

Other Useful and Interesting College-Planning Sites

- A link to most universities and colleges, listed alphabetically and by state

http://www.utexas.edu/world/univ/

- Career Development Manual (A nice interactive guide to careers)

http://www.adm.uwaterloo.ca/infocecs/CRC/manual-home.html

- Distance Education Clearinghouse

http://www.uwex.edu/disted/home.html

- A Comprehensive List of Distance Learning Sites

http://www.online.uillinois.edu/ramage/disted.html

- CampusTours

A guide to virtual tours at colleges and universities around the nation.

URL: http://www.campustours.com/

- Chuck Eby's Counseling Resources

The owner of this site provides a long list of links to college-planning sites categorized into Preparation, College Search and Information, College Information, and Special (e.g., historically black colleges and Business Trade & Technical Vocational Schools). Users will also find sources for study skills, financial aid information, career information, and resources for counselors and parents. The information has been kept up to date and is easy to use.

URL:
http://www.cybercom.com/~chuck/college.html

- Counselor-O-Matic

This service helps students select a range of appropriate schools: some that are "long shots," some that match the student's credentials, and some that are likely to be "safety schools."

URL:
http://www.review.com/time/counseloromatic/index.html

- Digital Campus

Link magazine's Digital Campus offers plenty of articles, links, and services relevant to U.S. college students.

URL: http://www.linkmag.com/

- The National Association of Secondary School Principals

Download the common application.

URL: http://www.nassp.org/services/commapp.htm

- *Getting Ready for College Early: A Handbook for Parents of Students in the Middle and Junior High School Years.* (August 1997). A useful book published by the U.S. Department of Education.

http://www.ed.gov/pubs/GettingReadyCollegeEarly/

- *How Can I Help My Gifted Child Plan for College?*

http://www.aspensys.com/eric/resources/parent/giftcoll.html

- *Preparing Your Child for College. A Resource Book for Parents,* 1996-97 Edition

http://www.ed.gov/pubs/Prepare/

- Princeton Review

RemindORama—a virtual nag! Register with this service and they will send you e-mail messages reminding you of critical college-planning dates.

URL: http://cgi.review.com/remind/

(If it doesn't work, try
http://cgi.review.com/remind/college/start3.cfm)

WWW Search Engines and Directories

World Wide Web search engines are used to search the Internet for information. They vary from one another; be sure to read the suggestions for searching that are available at each site.

- AltaVista—http://www.altavista.digital.com/
- Dogpile—http://www.dogpile.com
- Excite—http://www.excite.com
- Infoseek—http://www.infoseek.com
- Lycos—http://www.lycos.com/
- Magellan—http://www.mckinley.com/
- Snap Online—http://home.snap.com/
- Webcrawler—http://WWW.WebCrawler.com
- Yahoo—http://www.yahoo.com/
- And more . . . a variety of others can be seen at: http://cuiwww.unige.ch/meta-index.html or http://infopeople.berkeley.edu:8000/src/srctools.html

Note: The URLs were accurate and working when last checked. The Internet is a dynamic place, and changes take place rapidly and without warning. If you receive a message indicating that a URL cannot be found on the server, the server might not be accepting connections, or the URL might have changed. Try again later or truncate the URL to reach the site's home page. Truncating the URL means deleting the final portions of the address, leaving only the main part, or domain name. For example, the domain name for the College Board is www.collegeboard.org.

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Comprehensive Monitoring of a Student's Activities

Donald F. Rubovits & Jay F. Mulberry ■

Abstract

Individualized instruction and the associated accountability mean more documentation for teachers. How can teacher productivity be increased to handle the heavier workload? The solution for the Jacqueline Vaughn Occupational High School, a special education school in Chicago, was a networked local school computer linked to each teacher's personal computer. The networked computer stored the shared, character-based documents covering most aspects of each student's education. This paper discusses: (1) fundamental problems with paper-based systems for monitoring a student's education; (2) how a project to provide a solution was launched; (3) computer-based methods for creating student documentation, including Individual Education Plans (IEPs), Multi-Disciplinary Conferences (MDCs), Transition Planning Guides (TPGs), class/service/activity enrollments, job descriptions, anecdotal notes, and behavior referrals; (4) teacher communication tools, including electronic mail, school and personal calendars, announcements, and correspondence with parents; (5) assessment of the solution's impact during 2 years of experience at one school; and (6) considerations for other school districts, including funding priorities, teacher culture, computer system integration, cost justification, goal individualization, and special education issues. The paper concludes by noting that the "comprehensive monitoring" technology is here and that the technology helps both staff and parents manage a student's education. If schools are willing to deal with the consequences of more individualized instruction and greater accountability, they should pursue this type of program.

■

Introduction

The technology we are presenting has helped manage operations at a small high school for the past 2 years. The direct users of the technology are the teacher and support staff, not the student. Its relevance to this family-oriented conference: what's good for the teacher is good for the family. Our experience is that the comprehensive monitoring the technology supports is rare. Thus, we hope to make more of the education community aware that this technology is available today.

The Technology

The "technology" is a networked computer system for managing a school's operations. It runs a software package called DOC-FLOW™, a product of WorkFlow Incorporated. Every teacher and most of the support staff have their own personal computers. All are linked to the school's local computer that stores the shared database covering many facets of school operations. The computer system is specifically designed for teachers and provides a variety of tools. Tools include: (1) electronic folders and documents covering most aspects of both a student's individual activities and a staff person's responsibilities, (2) aids for recording information, (3) methods to monitor the flow of paperwork, and (4) electronic mail (e-mail). Besides handling formatted data such as names, numbers, and dates, this system is particularly well suited for unformatted variable-length information such as evaluations, goals, anecdotal comments, and ideas.

Benefits

The tools make it easier for teachers to do certain parts of their administrative work. Furthermore, they provide the school with a structure that fosters good documentation. And with immediate access to readable (i.e., *not* handwritten) documentation on the student, a teacher can learn quickly the

individual student's needs. As for parents, they have the right to view their child's records. They do not have to struggle with reading handwritten documents. The greatly expanded documentation of the school's relationship with their child enables them to make more appropriate suggestions to school staff. This capability is to education what an asset portfolio is to a financial planner . . . you have to know where you stand today to make good decisions for the future.

Definition of the Problem

Problems Inherent with Manual, Paper-based Systems

Two factors are creating pressure on schools for more documentation on each student:

- Advocates of high-quality education promote smaller class size and the associated individualized instruction. Unfortunately, individualized instruction requires more documentation.
- Grades and test scores are the traditional bases for accountability. They are easy to process, but many question their effectiveness for measuring success in learning. Any alternative will require more documentation.

The special education world calls the added documentation an Individual Education Plan (IEP). For regular education, the National Association of Secondary School Principals (*Breaking Ranks: Changing an American Institution*) calls it the Personal Plan for Progress. In both worlds, the documentation is based on goals and the reports on progress in meeting the goals. These reports take more teacher time to prepare than simple grades. What are the implications of added documentation that is paper based?

Creating Added Documentation. Goal and progress information includes at least the student's name, name of class or related service, date, and the author's identification. Many paper forms require considerably more descriptive information, most of which is simply copied from other records. Furthermore, many of the goals for students in the same class can be common. Finally, goals and progress are narrative information; they require editing. Manual methods for performing these tasks are painfully inefficient when compared to computer methods.

Updating Added Documentation. The maintenance of mandatory paper documents requires significant filing, retrieving from files, and re-filing. Those tasks can be particularly frustrating for teachers, who typically are under a constant barrage of demands on their time. The level of frustration can be so high that filing may be delayed or even never done.

Sharing Added Documentation. A number of different staff persons create information for and about a given student. If no other staff needed to read the author's documentation, private files would be sufficient. However, synergy among staff occurs only when information on students is shared. Methods for sharing dispersed pieces of paper simply are inefficient and ineffective.

Reading Added Documentation. Once accessed, the legibility of handwritten documents can be a major problem. Poor handwriting consumes extra staff time because it takes longer to read. At worst, a staff person may be deterred from even trying to read it.

Accountability. Some teachers are good documenters, and they document. Other teachers aren't and don't. And then there is everything in between. Thus, the quality of the documentation is uneven. To assure general compliance with school policy, someone besides the author has to conduct a review—whether peers or administration or both. But just as staff members need access to documentation for normal operations, they also need access for quality assurance purposes. If the documents are on paper, their collection and return are disruptive and expensive.

These fundamental problems are exacerbated with more voluminous documentation. Failure to alleviate them probably guarantees that the type of individualized instruction and accountability envisioned are unattainable.

How the Administrative Technology Project Started

Jacqueline Vaughn Occupational High School, in the Chicago Public School system, has 170 special education students between the ages of 14 and 21. They take appropriate classes, receive related services, work in school and commercially, and prepare for independent living after graduation.

The school had been using computers in the classroom for several years to help teach. Also, a few staff used computers as word processors. Starting in 1991, the principal targeted two complex processes for re-engineering:

- The process for creating and using IEPs. As a special education school, its most important document is the IEP. Annually, a multidisciplinary team prepares a new one for each student. Subsequently, those responsible for supporting the goals write periodic progress reports.
- Administration of teachers' nonteaching workload. Outside teaching itself, teachers are harried by both classroom administration and schoolwide responsibilities. These tasks require extensive sharing of information, documentation, and follow-up.

The school district's computer system for special education served all schools in the district. It monitored compliance with district procedures. It provided only limited day-to-day help for Vaughn's teaching staff. Consequently, school district headquarters funded the writing of a 75-page specification for a comprehensive computer system to help local school staff do their daily administrative tasks. A computer would be placed in the local school and would store the special education documentation required for each of its students. The final specification reflected extensive staff interviews and collaboration. While the original focus was on IEPs, it expanded into many documents and procedures.

Documentation on Students

Student Programs

Classes. The school offers a variety of classes. Enrolling a student in a class automatically creates a separate electronic folder that includes the schedule and location; an initial draft of a goal document (a carbon copy appears in the IEP folder); and room for anecdotal notes, behavioral records, and letters home. The classroom teacher can browse easily through the individual folders for the students in a class, updating each as required.

Related Services. Various specialists visit the school regularly to provide services to individuals and small groups. Services include psychological testing, speech therapy, nursing, hearing support, vision support, and occupational therapy. The school counselor, school social worker, and visiting psychologist lead group counseling sessions. These specialists submit via the computer system the evaluations required in the annual IEP and the triennial planning forms. Also, they record progress in meeting goals and other information appropriate for sharing.

Work Program: In-house Work. Supervised by school staff, students clean the building, prepare food in the cafeteria, operate office equipment, landscape neighbors' yards, and shovel snow off neighbors' walks in the winter.

Work Program: Commercial Work. Staff on a part-time basis manage the commercial work program. They recruit employers, prepare students for interviews, counsel students, maintain regular phone contact with employers, and visit job sites.

The work program administrators can record relevant information in the computer about each job and field work assignment. They also can keep electronic records of the school's relationship with each commercial employer. The computer system tracks interview schedules, job progress, site visit schedules, as well as events promoting good employer relations.

Transition Program. A coordinator plans and tracks activities the school undertakes to smooth a student's transition to life after graduation. They include such things as overseeing enrollments in programs run by state agencies. These activities start when the student enters the school. The transition coordinator stores in the computer system the descriptions of the activities, names of the responsible staff, and the activities' status. The computer system prints the information as the Transition Planning Guide (TPG), a formal special education document.

Admissions

Vaughn attracts applicants from many parts of the city who must meet certain criteria before being accepted. The admission coordinator can record essential information in separate electronic folders for each applicant. The system tracks the admissions process.

Inclusive Activities

Vaughn has admitted only special education students. To develop relationships with nondisabled peers, the students have participated in a variety of integrated (i.e., "inclusion") activities. They included classes at nearby high schools, a program at a nearby junior college, visits by students from other high schools, field trips, and commercial jobs.

The school staff carefully recorded participation in these integrated activities because they are so critical to the transition to independent living. The computer system subsequently prepares an addendum to the IEP that lists past and current enrollments in them. Also, the computer system prints rosters to help the staff manage the logistics of these activities, most of which require transportation.

Discipline Administration

As soon as behavior incidents are reported, the principal entered relevant information into the electronic folders of the involved students. For complicated cases, other staff added their comments. The entire staff, from security guard to school office staff to teacher, can learn what happened, what disciplinary action has been taken, and what suspensions are in effect.

Case Management

A case manager maintains the staff's focus on each student's individual needs. Among other things, he managed all aspects of the annual IEP conference required for each student, admitted new students to the school, and managed enrollments in classes and services.

A student's education plan is comprised of narratives contributed by a number of staff persons. The IEP document includes at least ten pages of narratives and student data. The triennial Multi-Disciplinary Conference document has three pages. The Transition Planning Guide has six pages. The case manager coordinates the timely preparation of these narratives. The computer system assembles all document components and prints them in the formats specified by the school district.

The timing for the printing of these documents is important. Staff may prepare drafts of their material before the IEP conference. Final judgments are reserved until the conference itself. After discussion among staff, parents, and child, staff members edit their respective narratives to reflect the group's decisions. There are two computers in the IEP conference room for this purpose, and more are available in adjoining offices of the Counseling Center. The final documents are printed on a laser printer also located in the IEP conference room. The meeting ends after the involved parties sign the documents.

Teacher Communications

Private Communication

The system includes e-mail for the entire staff. It allows them to exchange mail both locally at the school and worldwide with anyone connected to the Internet. Although e-mail operates as an independent subsystem, an e-mail message can be copied locally to any electronic folder. For example, a teacher can copy a message about a student to the student's electronic folder. The e-mail thus joins IEPs, goals, anecdotal notes, behavior reports, and letters to parents as part of the "intimate, comprehensive view of the school's relationship with the student."

Personal Features for Each Staff Person

Personal Folders. Each staff person has at least one electronic personal folder. The folders are useful for storing miscellaneous form letters, reminders, notes, and e-mail.

Personal Calendar. Personal calendars for each staff person are integrated into the system. Properly marking any note or e-mail document in any of the electronic folders causes an entry to be included in the document creator's personal calendar. If the need for the document is temporary, the staff person deletes it when the task is completed; otherwise, the document remains as a permanent part of the folder. These notes and important e-mail messages enhance the descriptions of the school's relationships with its students while helping staff organize their time.

Public Communication among Staff

Scheduled Events. The principal and selected staff create a document for every scheduled school event (e.g., holidays, in-service training, local school council meetings, visits by dignitaries, deadlines). The computer system tracks the active school events and displays them as the school calendar for internal use. The school calendar contains only a brief "headline" for each event; the user can read the details by directly retrieving the document from the school calendar screen.

Required Staff Reading. The principal wrote a daily newsletter. Other staff prepared documents to announce special information. Staff members were expected to read them because they were the school's primary, and usually only, method for disseminating general information.

Public Folders. The school has project folders for school rules, procedures for using the computer system, minutes of the Fine Arts Committee, nominations for Student of the Month award, and almost every aspect of the school's operations. They offer a convenient method for storing and sharing information. In effect, they are bulletin boards on topics of special interest.

Letters to Parents and Employers

Parent involvement is critical to school success. Communication with parents is a prerequisite to their involvement. The system makes it easier to send personal letters to parents. The teachers need only enter the text of the letter and modify computer-generated data (parent name, address, teacher's name and title) as required. The teacher can copy even the text itself from other letters and then make changes as needed.

The school office staff has used the "Letter to Parent" feature to produce individualized parent consent forms. The computer system prints with typeset quality the completed letter, including the school letterhead. The electronic version of the letter remains part of the student's folder.

The work program coordinators used a similar capability to send letters to employers. This capability fosters a professional relationship with employers, which is particularly important when supervision of the school's very special students requires joint effort.

Assessment of the System's Impact

Was the computer system hardware and software installed as planned?

- For local school operations: yes. In fact, because the Internet is now connected throughout the school, the system infrastructure is being used for educational as well as administrative purposes.
- Has Phase II of the project—linking the local school computer to the district's mainframe computer—been implemented? Not yet.

Did the staff use the system?

- Essentially 100% of the staff used the system to read the principal's daily newsletter, the daily events schedule, personal e-mail, and in-process behavior referrals (i.e., discipline cases). This level of use came about because the principal discontinued the paper-based newsletter and relied heavily on those means to communicate with the staff.
- The principal personally used almost every feature of the system.
- All teachers prepared class and individual student goals on the system. Visiting specialists providing related services used the system to prepare their evaluations and goals for the IEPs and MDCs. Visiting specialists had to use the system because after 3 months of the 2-year period passed, handwriting of IEPs and MDCs was discontinued.
- Some staff used most of the features, particularly anecdotal notes about students and letters to parents.
- The Case Manager used the system intensively to complete IEPs and MDCs. The Transition Coordinator used the system intensively to prepare TPGs. Other coordinators used less intensively the specialized subsystems designed for them.

Were the fundamental problems resulting from information being on paper alleviated?

- Was documentation created more efficiently? Yes.
- Was documentation updated more efficiently? In the 2 years, we did not reach the goal of professionals working almost exclusively electronically and support staff handling the paper. With more time, selected staff responsibilities can be realigned to reflect the technology and then that goal will be reached.
- Was student documentation shared? Some teachers read some of the electronic documentation; we believe others read it infrequently.
- Was documentation legible? Of course.
- Was documentation available for quality assurance purposes? Yes. Was it accessed for that purpose? Not yet.

Did the quality of the IEP goals improve? Such improvement is hard to demonstrate. Writing goals is an art. We would like to think the efficiency of the system left teachers with more time to improve the appropriateness of the goals they wrote.

Were the IEP conferences with parents run any better? The printing of the IEPs at the end of the conference was certainly impressive.

Were the reports on progress in meeting goals more frequent and of higher quality? A few teachers religiously used the system to report progress frequently.

Were communications improved?

- Between principal and staff? Absolutely.
- Among staff? Sometimes. The nurse announced special accommodations for certain students. The cafeteria manager announced schedules. The school secretary announced that coffee money was due. The Case Manager published IEP staff schedules. Teachers submitted information to the summer school coordinator via documents in public folders. These uses were growing and were being refined frequently.
- Between teacher and parents? Several teachers were using the "Letter to Parents" feature to prepare individual letters to the parents of all students in their classes.

Was traditional classroom management simplified for the teachers? The system specifically excluded attendance reporting and grades because existing districtwide procedures governed those tasks. Did teachers use the Personal Calendar feature? No.

Could the office staff be more responsive to questions? Absolutely. For example, immediately accessible were teacher and student schedules, student addresses and telephone numbers, and which students were on each bus.

Was the objective of "comprehensive monitoring" achieved? Yes, pretty well. After the accumulation of 2 years of data, one can read the electronic folders of many students and have a good idea of what's happening.

Did the system provide a structure for school operations? Yes. We were surprised by the number of staff who lacked a global view of school operations. As a consequence, we devoted more staff training to school procedures than to computer procedures (i.e., which keys you press). The system imposed on them a common way of doing things, and it was clear that it would be easy to review what they did. We believe this impact was one of the most valuable the system provided.

How were operations affected by virtue of the software being new? The software used in this project represented a new version of WorkFlow Incorporated's product, which was in commercial use since 1988. After operations with the computer started, staff made many suggestions. Thus, new features as well as refinements to existing features were added regularly to the system throughout the 2 years. By the end of the 2 years, the set of system features was stable. However, the changes did extend the learning time for some staff.

Was the system reliable? The hardware worked flawlessly. Downtime of the complete system was rare.

Was a comprehensive technology plan developed for the school? Yes.

Considerations for Other School Districts

Funding Priorities

In the education world, almost everything written about technology is directed toward teaching applications, not administrative uses. Reasons for this focus include:

- Education's reason for existence is to equip the student with appropriate skills. Certainly teaching applications should receive priority when competing for technology dollars.
- Many buildings still lack the cabling needed to support schoolwide networks. To obtain the full benefits of this type of administrative system, the school must have it.
- Teachers' interests lie in teaching, not administration.
- Teachers have control over software that runs on personal computers, not software that serves an entire organization.
- School administrators are former teachers and typically have limited experience with multiuser administrative systems.

Those most concerned with administrative systems are usually at school district headquarters. They are consumed with running district-level systems to monitor compliance and secure government funding. Day-to-day problems with local school operations often are not a top priority.

For administrators directed to provide more individualized instruction, teacher productivity becomes an issue. They must explain how existing staff can handle the added documentation. The administrative system is a means. However, to receive funding priority, it must be presented as a prerequisite for the end—individualized instruction.

Teacher Culture

Our experience is that some teachers quickly learn to use the system, while others have major problems. For the latter, the school must commit extra training and support. The job is really not done until the needs of this group are addressed. School leadership also must be sensitive to system design trade-offs between marginal efficiency gains and ease of use. Ease of use should win every time! There is a relatively low limit to what the entire school staff can be expected to learn.

Broad acceptance of a comprehensive system is evolutionary. Some factors critical to a system's success are the principal's personal use of the system, certification of staff to use it, good system support, and ease in changing the system design to handle new school procedures.

Technical Infrastructure

Integrating a new system into existing systems can present formidable technical problems. More than one disagreement has arisen over the best way to do it. Technical staff, in particular, may have agendas covering the gamut of hardware, software, and support. Nontechnical staff should understand that new requirements often appear to be in conflict with these agendas. However, additional design effort may make the two compatible.

System Costs

Computers are expensive. That's why funding organizations are making school technology plans imperative. These plans present the "business case" (i.e., the justification) for projects. Our presentation has been on nonteaching uses. But the same equipment can be used for teaching. How should costs be allocated to the different purposes?

One dimension of the issue is the availability of government funds. They typically are tied to specific objectives. The government does not care if other objectives can be met with the same acquisition, so costs are allocated to the purpose for which the funding is received. In this circumstance, other applications have a "free ride."

Another dimension to the allocation problem is how much should come from the local school budget and how much from a district-level department's budget? For example, one solution is that the local school pay for computer hardware and that the district-level department pay for the software and support.

Yet another dimension of cost is time. There is a definite limit to how much technology a school can absorb at one time; for example, staff responsibilities may be realigned, school procedures changed, and staff trained. Thus, the issue is not only how much the technology costs, it is also how fast it can be implemented realistically. By extending the implementation interval, the funding may be easier to obtain.

For software of the type we have described, the initial cost can easily run $50,000 for a single school. Understand that this cost includes planning, configuration, installation, and training. Ongoing support costs can amount to 15% to 20% of the initial cost. A small school with a staff of 25 would spend initially $2,000 per staff person and annually thereafter $400 per staff person. If a district installs the system at multiple schools, the cost per school becomes less.

Information Week (9/22/97, p. 42) reports that companies may spend on computers between $15,000 and $1,500 per employee per year. Computer firms and banks spend at the high end; food-processing companies spend at the low end. From one frame of reference, school expenditures can be compared to food-processing company expenditures. Note that computer hardware is an integral part of the teaching process and is comparable to the machinery in a food-processing plant. Since the $1,500 annual expenditure in the food-processing companies does not include machinery, computer hardware in the local school can be excluded from this comparison. With this logic, a school spending $2,000 initially and $400 annually is in line with a food-processing company spending $1,500 annually.

Another frame of reference would be to compare what is spent on computers at district headquarters with what is spent on administrative software at local schools.

Special Education Practices

The special education world has procedural safeguards to assure their students receive what is due them. For example:

- They can't use "boilerplate" (produced on a copier) goals.

- They can't conclude anything in advance of the IEP meeting.
- IEPs must be kept secure to maintain their confidentiality.

Professionals have told us that these safeguards preclude using a computer for IEPs. We believe that conclusion is wrong because it does not distinguish between means and ends.

One end is that an IEP reflect the synergy emanating from an annual multidisciplinary staff meeting with the parents. Whether the documentation is prepared with a pen or a keyboard is irrelevant; both are a means. In both cases, a piece of paper is produced and signed by all relevant parties. Regardless of the preparation technique, staff members are ultimately responsible for the appropriateness of specific goals for the student and the efforts to achieve them.

Another end is confidentiality. The traditional means for achieving that end is locking all the information in a filing cabinet. Another means is to store it on a shared computer that has appropriate security features. Confidential data have been maintained on computers in the business world for 35 years. Computers can restrict access only to authorized staff. What about a social worker's personal notes? If data are not meant to be shared, they should not be stored on a shared computer.

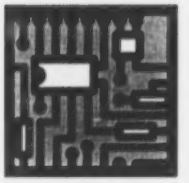
Conclusions

This paper explained in some detail how technology can help teachers manage their tasks. While it described the experiences of a special education school, it applies to any school committed to more individualized instruction.

Our messages to families and school administrators alike are these. The "comprehensive monitoring" technology is here. It's relatively easy to replicate. Depending on your priorities, it's affordable. It gives structure to a school's operations. It improves communications. It collects the history of the school's relationship with the student. With it, both the school staff and parents can do a better job of managing their children's education. The technology adds a new set of problems but it helps the teaching staff to operate on a more professional plane. If you are willing to deal with the consequences of more individualized instruction and greater accountability, you should pursue this type of program.

■

internet



One of the key questions that we wanted to explore at the Families, Technology, and Education conference was whether (and how) the Internet's impact on children and family life differed fundamentally from the impact of television. The papers included here again illustrate the variety of applications that are relevant to families and the many issues and opportunities that the Internet poses for families. Home schooling (Scott Somerville); the Internet as a personal communication channel (J. Michael Jaffe and Amy Aidman); the Internet's effects on young adolescents (Myron Orleans and Margaret C. Laney); using the Internet to strengthen community programs and collaborations for children, youth, and families at risk (Josephine A. Swanson, June P. Mead, and Heidi L. Haugen); and ethical online behavior (Nancy Willard) are the areas highlighted in these papers.

Not included in this section are the following papers presented in this strand at the conference:

Larry Rudner, *Internet and CD-ROM Based Tests*
Carl Smith, *Grow Together through Stories*

Our conclusion? The *interactivity* of the Internet—at a level not widely possible at this time with television—appears to heighten its impact on families, especially when compared to television. Families tell us that electronic mail has changed their lives through its capability to keep family members in touch with each other and with others who have similar interests. A second aspect of the Internet, its potential to democratize access to information on education and other family concerns, also has a significant effect on the adults in the family. Parents now have access to much the same information base of educational research as educators and health providers, although we have yet to see how that will affect these areas of family life in the long term.

High-Tech Home Schooling

Scott W. Somerville ■

Abstract

Directed at home school teachers, this paper criticizes public schools for not embracing technology and suggests that much of the current educational software is inadequate. The paper notes that home schoolers are creating a revolution in the educational software marketplace, because home school teachers are looking for the best tools they can get. The computer can automate the drudge work such as developing lesson plans, record keeping, and generating drills and spelling lists, but it can go beyond these mundane uses to help children learn French, piano, typing, publishing, and more. With Internet access, computers open whole new worlds for home-schooled children.

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By the time your grandchildren are ready for school, home schooling energy plus computer power should have changed the face of education forever. Teachers' unions and school bureaucracies have managed to keep the information revolution out of the public schools for a generation, but those days are numbered. The revolution is happening today, and you should join it.

But first, a word of caution. Much of the educational software that exists today is a joke. The reason for this is simple. Job-protecting teachers and risk-averse bureaucrats have refused to buy the kind of software that can do any serious teaching. Software manufacturers, realizing that they cannot crack the education market, develop "educational software," which is really just video games. Calling this software "educational" is like adding vitamins to potato chips and calling it health food. It's reprehensible, but it isn't stupid—software manufacturers know that parents will buy software if they think it's good for their kids, while many teachers won't buy software if they think it might threaten their jobs.

Home schoolers are creating a revolution in this marketplace, because home school teachers are looking for the best tools they can get. Let's face it, one thing home schoolers have enough of is job security. We could use some labor-saving devices, and the computer is truly that. IBM used to have a slogan that went, "computers should work, people should think." Nowhere is this truer than in home schooling. How many hours do you spend checking math answers? Why are you doing this, when a computer could do it for you? And how about flash cards? Ninety-five percent of the flash card work you are doing (or aren't doing because you find it so boring) could be done by your computer.

By the time your grandchildren start school, the tedious part of your life as a home schooler should be fully automated. Lesson plans, record keeping, drills, spelling lists—all this you shouldn't have to do! Some of this software already exists or is being developed right now for the home school market. Unfortunately, it is still a jungle out there, so keep your eyes on magazines like *Practical Home Schooling* to help you separate the wheat from the chaff.

But the computer can do more than just automate the drudge work. It can also boldly take you where no mom has gone before. Ten years ago you would have been hard put to find a housewife who could layout and edit a professional looking newsletter or magazine. Now, thanks to desktop publishing software, it seems like everyone's a publisher. Nowadays, the computer does all the hard part of the job, and you get to do the fun stuff. The same holds true in many other fields. Twelve years ago, I was a young computer programmer who had never seen a metal-working machine. Then I was given

the job of programming a very sophisticated computer to cut molds out of aluminum. Within 4 months, I was machining complex molds—but only because the software did all the hard work for me. Computers should work; people should think. It really can happen.

With the very sophisticated software that is now available, your child can learn French, piano, typing, publishing, and much, much more. Plug a telephone line into your computer, and open whole new worlds. My grandfather-in-law is a retired Air Force scientist. He spends all his free time in Florida talking with his buddies on CompuServe. My children can have a science tutor online anytime they want one. How many other retired teachers, scientists, or pastors are out there longing for a way to share their knowledge and wisdom with a new generation?

Let's face it. Most real people are scared of computers. But you as a home school teacher have a reason to overcome your fear. This machine can make your job easier and help you do it better. By contrast, the public school teacher down the street is terrified of the computer, too. Not only does she not understand it, but it could cost her her job. She knows that if the information revolution ever reaches education, she'll be flipping burgers at Wendy's.

The revolution is now. Join it!

Resource List

Pride, Bill, & Pride, Mary. (1992). *Pride's guide to educational software*. Wheaton, IL: Crossway Books.

Practical Home Schooling. Fenton, MO: Home Life.

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Families, Geographical Separation, and the Internet:
A Theoretical Prospectus

J. Michael Jaffe & Amy Aidman

Abstract

The perception and acceptance of the Internet as a personal communication channel, and the functional characteristics of the Internet, provide a new means for geographically separated friends and family members to communicate with one another. This paper presents a theoretical framework for the study of family communication and electronic mail. A review of connected issues is presented, including (a) the Internet and trends in human communication, (b) definitions of the family, (c) what relocation means for individuals and families, (d) communication technologies, (e) theories of family communication processes, (f) individuals as members of organizations, (g) organizations and the Internet, and (h) media theory and the Internet. Conclusions of this theoretical review propose guidelines for applied research to examine Internet communication among nuclear families and geographically dispersed family and extended family members. Such research would be an important component in understanding the potentially central functions of computer-mediated communication in nuclear and extended family dynamics. Findings of related research may be crucial for institutions concerned with social effects of geographic mobility and networked communication upon organizational members and their families.

Introduction

Up until 160 years ago, when the telegraph was invented, human communication depended upon a proximal human presence along the channel of communication. Systems of human-based messengers or line-of-sight relays helped extended and dispersed civilizations organize, operate, interact, and otherwise stay in touch. In the brief history since the introduction of the telegraph, human communication technology development has accelerated at an unprecedented rate. The capabilities and modalities of these developments are in a dynamic state as are our expectations and desires for speed and efficiency. We need not belabor the point that networked human communication is communicating at an asymptotic rate with electronic circuit and broadcast technologies. While most of us would be hard-pressed to explain the circuit-multiplexing technology of the telephone, let alone the time-multiplexed, packet-switched technology of the Internet, that lack of understanding does not undermine our acceptance of and adaptation to the new technologies.

The 1997 Find/SVP American Internet User Survey estimates that 31.3 million adults currently use the Internet in some form or another, and of these people, 59% use electronic mail (e-mail) on a daily basis. Only 49% of Internet users, by comparison, use the World Wide Web on a daily basis, while 3.6 million Internet users use it for e-mail only (Riphagen & Kanfer, 1997). Based on that survey, NCSA conducted a study on e-mail use. They asked people about where the people they talk with live.

> The results indicate that 64 percent of the people that non-users talked to live in the same town or neighborhood as they do, while only 48 percent of the people that e-mail users talked to live within the same town (t = 2.944, p = 0.005). Actually, the dividing line could have been drawn at any distance; e-mail users are more likely to talk to people outside their neighborhood, outside their town, outside their county, state, or country. What this tells us is that the network of people

> that e-mail users talk to is more geographically spread out than that of people who don't use e-mail. It seems that going online will facilitate communication with people who live further away. (Riphagen & Kanfer, 1997)

The development of far-reaching communication networks has occurred concurrently with an increasing migratory mobility of individuals. According to 1995 U.S. Census data, 5.8% of U.S. citizens moved to different counties, while 2.6% moved to different states between March 1993 and March 1994. This finding reflects a stable rate of migration over the last decade, and it implies that many of us will find ourselves moving great distances from our loved ones. For those of us in academia and the military, this figure is probably higher.

This paper offers a theoretical framework for the study of family communication and e-mail, particularly in cases of geographical separation. A review of connected issues is presented, including the Internet and trends in human communication, definitions of the family, what relocation means for individuals and families, communication technologies, theories of family communication processes, individuals as members of organizations, organizations and the Internet, and media theory and the Internet. Based on a review of the issues, we propose a theoretical model and an outline for research. Specifically, we aim to unpack the evolving role of e-mail in the context of the relocating family.

The Internet and Trends in Human Communication

Several trends in human communication seem to be reconfirmed in the establishment and growth of the Internet:

- The speed at which information is transferred is growing, though user expectations and wishes always seem to outpace development.
- Mediated communication technologies are proliferating globally. Interpersonal communication channels are, in short, vastly interconnected; individuals can speak to each other as well as obtain information from a multitude of sources. With the rich network of telephony infrastructure, ground-based radio-wave broadcasting, and the deployment of geostationary and orbiting communication satellites, there is literally no geographic boundary impeding an electronically mediated message where the technology is available.
- Media technologies are becoming more "personal." Electronic circuits have tended toward miniaturization, progressing from vacuum tubes to transistors, solid-state circuitry, and microcircuitry, thereby making devices such as radios, telephones, televisions, and computers easier to carry on the person and place in the home. Dropping manufacturing costs, reflecting economies of scale, make these technologies affordable for more people, though it is clear that higher "tiers" of a technology, "home theater" television, for instance, still distinguish economic status.
- Media technologies are becoming more intelligent. Largely in response to information overload resulting from the first trend noted above, new media are becoming characterized by the degree to which their operation is customized to our personal processing characteristics and preferences. E-mail programs, for instance, commonly include filtering specifications that allow users to specify certain addresses from which e-mail messages will be ignored and deleted automatically.

These increases in speed, global interconnectedness, personalization and affordability, and intelligence are integral to the wide acceptance the new technologies are gaining among individuals in general and among those who may be separated by geographical distance from family in particular. The following sections consider the definition of family and the modern phenomenon of families who undergo geographical relocation.

Defining the Family

Before we can begin to consider communication processes that involve families, it is necessary to clearly define what a "family" is. While this exercise might have been considered nitpicking or overly pedantic 50 years ago, today the definition of family is a dynamic issue that brings with it political, religious, and cultural significance. It seems myopic to limit our definition of family to ties of blood or of communally sanctioned marriage.

According to Sussman (1959), a married person's extended American family system consists of three interlocking nuclear families: the family of

procreation, the family of orientation, and the family of affinal relations, such as in-laws and close friends, whose interrelationships are determined by choice and residential proximity and not by culturally binding or legally enforced norms (p. 1). Sussman (1959) also wrote that despite trends of nuclearization, there are some empirical indications that many nuclear families are closely related within a matrix of mutual assistance and activity that results in an interdependent kin-related family system rather than the common depiction of the isolated nuclear family (p. 2).

> Historically three solutions have been proposed as definitions of what constitutes a family. The first class of definitions is based on family structure. An extended family is any group of individuals that has established biological or sociolegal legitimacy by virtue of shared genetics, marriage, or adoption. A nuclear family is further restricted to those extended family members residing within the same home. The second set of definitions focuses on whether certain tasks of family life are performed. Here a family is a psychosocial group consisting of at least one adult member and one or more other persons that as a group works toward mutual need fulfillment, nurturance, and development. A final class of definitions gives central importance to transactional processes. The family is a group of intimates who generate a sense of home and group identity, complete with strong ties of loyalty and emotion, and an experience of a history and a future. (Fitzpatrick & Wamboldt, 1990, p. 425)

As communication is in fact a transactional process, the latter definition seems most appropriate for our theoretical treatment.

Yerby's (1995) definition goes further to express the continually changing nature of the family:

> A family is a collection of individuals who create a history and a set of memories from which family experience is continually reconstructed. In a sense, it is the shared memories of the family that help to make behavior in the family predictable and stable. (p. 352)

This definition is especially relevant to families who are relocating because it includes the possibility for looking at changes that might occur, especially in times of transition. The importance of extended family contact becomes especially evident during times of transition and crisis, when material and emotional support are most needed.

The Impact of Moving

Moving away from family is disruptive to the family ties, and it calls for social reorientation. Organizational members and their families who relocate undergo various types and degrees of stress and strain. In essence, these individuals become socially dislocated to the extent that they become separated from a local network of support and affiliation. Moving usually poses the challenge of learning new social coping skills, whether these include locating medical services or cultivating a circle of friends. Of course, many people, if not most, miss the kinship and security manifested in proximal interactions with friends, family, and colleagues they leave behind. People like knowing that they can shop, pray, eat, discuss, spectate, and bowl with certain others in familiar settings.

Moving can have an impact on individual and group identity. Identity, after all, is how we relate ourselves to our environments; more specifically, how we identify ourselves in relation to the *agencies* with which we interact. Therefore, when individuals move, they undergo some process of self-redefinition so that they can *recognize themselves* and recognize *their place* as agents in their new social environment. Likewise, the identification that family members feel with other family units might change as a result of new interests and values accompanying a change of venue. For example, new social pastimes might accompany a move to a different meteorological climate. Political redefinition or even realignment might be an outcome of a move to a region with certain sociopolitical tensions.

The concept of recognizing oneself and one's place in physical and social environments is of key importance considering that human beings have evolved and survived as information-processing, pattern-recognizing animals. The combination of organized, cooperative tribal activity with the drive to reduce environmental uncertainty in ever-increasing geographic ranges was crucial in man's functioning as a hunter/gatherer. The conclusion that one cannot recognize environmental patterns generates the affective, uncomfortable internal response of confusion.

As groups, human beings evolved successfully in changing contexts, not on the basis of a "hard-shelled" invulnerability, but by integrating environmental patterns and essential details into tribal

strategies. As individuals, human beings exercise social information processing to perceive, manipulate, and organize information about ourselves and others in the social world. Recognizing where one is socially placed is part and parcel of uncertainty reduction in human social contexts.

Communication Technologies and Staying in Touch

When a person relocates over a long distance, there is an anxiety that the intimacy of relationships with those left behind will deteriorate because of limitations of communication. Long-distance relationships of intimacy, especially those based upon shared activities, are undesirable in part because participants lack the means of transmitting and receiving expressive messages. The intimacy of face-to-face conversation depends on channels of communication that are "rich" and evoke feelings of "social presence." Richness in a medium refers to its variety of channels and symbols in use. Face-to-face, or FTF, is the richest of media because it affords communicators with the greatest variety of options, including facial, lingual, and paralingual expression. Typewritten text, on the other end of the continuum, is considered media poor.

Social presence is the strength of the feeling that one's co-communicator is "present" on the channel and is indeed another person. Immediate transmission and reception as well as media richness contribute to social presence. The telephone is considered to be a widely used interpersonal medium with the highest potential for social presence, though its audio-only mode limits its media richness. However, long-distance telephone use is relatively expensive compared with postal mail, and therefore with increased distance, the telephone is a less satisfactory mode of regular communication. Some people in fact use the postal mail to send audiotapes and photographs, thereby increasing media richness, but the immediacy is lost on a medium whose transmission typically requires at least two days.

It is clear, though, that people try to maintain contact with family members and intimate friends when they move away. Even over long distances, individuals provide each other with emotional support through media-poor and nonimmediate channels. Long-distance social networks, especially kin-oriented ones, can mobilize instrumental support during emergency situations. The centrality of one's individual or family cultural orientation may be especially strong and have emotional impacts, and may best be served by maintaining long-distance ties with others in that culture. Most important, perhaps, and the most difficult to deconstruct, is the emotional kinship that develops in relations of intimacy over time.

Thus, for the individual, there are various sources of stress and strain that accompany a long-distance relocation. Additional efforts are spent in parallel processes of maintaining distant ties of intimacy and forming new ones. It should be noted, though, that the effort to maintain ties is often "its own reward" because the communication process provides dimensions of social support and a sense of belonging. For families, these concerns are compounded when individuals serve the additional function of easing the transition period involved in moving for their young children or, in some cases, elderly parents.

The importance of seemingly trivial personal contacts over the course of time cannot be overestimated. Duck (1988) found that mundane, routine interactions play a significant role in the maintenance of close relationships. The character of everyday, routine interactions with intimates such as family and friends is a particularly important communicative mechanism for the maintenance and elaboration of working models of relationships and beliefs about the social world (p. 430). Our behaviors, even the mundane ones, in different social networks actually define the nature of these networks and their meaning to us. These behaviors, in turn, become functions of how we perceive the social environment, largely on the basis of familiarity with the agents in them. Hence, part of relocation stress is the disruption of these behaviors and, simultaneously, the break in the familiar social structure.

We see frequency of communication with intimate others left behind as a means of lessening the impact of such disruption. As Duck and Pittman (1994, p. 679) put it, talk, or interpersonal communication interaction, serves three specific relationship functions. Talk is instrumental in that it achieves concrete, specific aims. Talk is indexical in that its patterns manifest a relationship (e.g., through personal idioms). Talk is also essential in that it embodies a relationship through simple occurrence and presentation of world views.

Leach and Braithwaite (1996) refer to families as "one of the most important sources of informal support" (p. 201) not only in stressful situations but on an everyday basis as well. "The nature and provision of informal support within American families has changed dramatically, due to such factors as the geographic mobility of families..." (p. 201) so that families have to develop some sort of mechanism for maintaining contact, exchanging information, and giving support. Leach and Braithwaite point out that there is very little research on how family members maintain contact- and support-giving functions. Their own research focuses on the existence of particular family members known as "kinkeepers," who are those individuals in families who take responsibility for keeping the family in touch.

Leach (Leach, 1991; cited in Leach & Braithwaite, 1996) found in an exploratory study of kinkeepers that their communicative activities involve face-to-face visits and telephone calls more than any other type of channel. The results of that study found that the telephone was the most widely used channel (71.42%), followed by visits (20.53%), letter writing (4.46%), and sending cards (2.68%). E-mail was not mentioned as a channel, but it is easy to imagine that e-mail might provide an efficient channel for fulfilling kinkeeper functions that provide family support such as exchange of family information, keeping family members in touch, or gathering information for family planning to organize projects or events. While the original data for that study were collected as part of a 1992 master's thesis, the communication landscape has changed drastically since then. We still do not have the research to reflect that change in family communication.

Theoretical Approaches to Understanding Family Communication

Research on family processes cuts across disciplines in the social sciences. There are many ways to study family communication. Meadowcroft and Fitzpatrick (1988) delineate the metatheoretical overlap between mass communication study of family communication and interpersonal studies and spell out a model of family communication effects. They detail six major metatheoretical perspectives in the study of marriage and family communication. Each of the six emphasizes the development of intersubjectivity or mutual influence processes. Intersubjectivity involves shared meanings, while mutual influence involves bi-directional processes.

> Intersubjectivity is the creation of shared meaning or the process by which we understand others and are understood by them. Although we can never fully understand another, complete and total misunderstanding rarely occurs. Rather, intersubjectivity is more the rule than the exception. Thus the degree of intersubjectivity established through the knowledge shared by family members based on their common experiences is an important topic in studies of family communication. (Fitzpatrick & Wamboldt, 1990, p. 423)

It is the shared meaning systems, history, and common beliefs and approaches to the social world that set family communication apart from other forms of human communication. The meta-structures that guide communication are likely to have more in common within families than within other groups. It is suggested that a complete theory of family communication has to consider both the intrapersonal and interpersonal levels of analysis. Intrapersonal concentrates on the individual traits or states to explain communication patterns, while an interpersonal approach focuses on dyads or family groups and examines how communication between the members contributes to change or stability. Such a view would help to reveal the mechanisms that generate intersubjectivity as well as impact.

According to Meadowcroft and Fitzpatrick (1988), communications researchers have largely focused on a single theoretical framework; however, the research could benefit from broadening the approaches to family communications research. Two strains of theory that would be especially relevant to a study of families' use of e-mail are the systems theories, in which relational patterns underlie and define the family system, and the developmental position, which stresses that families are evolving over time, are not static, and that it is important to examine how families adapt to change either within the family or from the world outside the family. Communication researchers have applied a perspective grounded in symbolic interactionism that asks:

> How do life circumstances influence the human mind and the interaction that results from what goes on in that mind?... A key assumption made about the relationship between the human mind and social interaction is that individuals come to define themselves and the world around them

> through interactions with other people. (Meadowcroft & Fitzpatrick, 1988, pp. 260-261)

Alison Alexander (1994) focuses on television in the family context; however, what she writes has relevance for the study of e-mail in the family context. The family is conceptualized as a system, and the research on communication in the family has taken a symbolic interactionist view—that is, that the structures and processes that regulate a family are created through communicative interaction. The research strives to reveal patterns in family communication. Alexander points out that in order to go beyond a limited effects conclusion (media effects on family are complex, mediated, and not very powerful), it is important for research to consider the within-family behaviors that create meaning for the individuals in the family system, such as "the creation of family and individual images, the creation and communication of intimacy, the creation and communication of family roles and types, the creation and communication of power, the management of decisions, and of conflict" (Alexander, 1994, p. 54). She notes that very little research has been done on the concepts of support or encouragement in the family, whereas issues of power and conflict are more frequently studied.

Family systems theory is presented by Yerby (1995) as a model that is not static, but that is evolving. Yerby (1995) "describes the recent thinking about family process that has emerged from the postmodern critique of objective social science and integrates some of these ideas into a framework that includes a systemic view of the family that is grounded in social construction theory and dialectical processes" (p. 341). It is pointed out that criticism of family systems theory problematizes the focus on patterns and stability, while ignoring the fluidity and flux in the family system. The historical systems perspective of the family rests on the view that families are resistant to change and that the goal is to maintain equilibrium. But is stability the norm and change the exception? Or would it be more informative to examine the processes of change since families are in a continual state of change?

"Social constructionists explore how reality is intersubjectively created through communication . . . . Social construction theory . . . emphasizes social, interactive, and performance processes in the creation of reality and meaning" (Yerby, 1995, pp. 347-348). It attempts to get at people's identities and how those identities are influenced by the contexts of their lives (in this case, family). Reality is "co-constructed" through conversation, and knowledge is arrived at by communicating about and sifting through various perspectives. Identity, knowledge, and the stories we tell "are systematically embedded in a vast web of ever-changing social and historical contexts" (p. 349). As Yerby (1995) points out, we want to be able to address "the complexity, contradiction, flux, ambiguity, and sense of incompleteness that usually characterizes human experience" (p. 349).

> Making decisions or choices about how or to what extent a family will adapt to the fluctuations within and around them is one of the central themes of family life. A systems model that shifts the focus from attending to stable patterns in the family to attending to the family's capacity for change emphasizes the tendency for family life to be an evolving ongoing conversation among family members, in which the dialogue has the potentiality for taking new directions. (Lax, cited in Yerby, 1995, p. 353)

The social constructionist approach can be instrumental in providing insight into the processes involved in readjustment that families undergo when relocating and the role that e-mail might play in that readjustment.

Organizations and the Place of the Individual

A bureaucratic model of an organization reduces members to specific functions. The relational concerns between the organization and the member are limited to the member's ability to fill that function and the official or contractual responsibilities the organization expects. Under a bureaucratic model, relocation stresses upon the member or his or her family are largely irrelevant to the organization because they should not have an immediate impact on the utility of the member to contribute to organizational goals. Moreover, the use of organizational facilities to alleviate relocation stresses would generally not be encouraged except for uses clearly predefined as policy or within a specific employment contract.

Under a human relations model, with its roots in Maslow's hierarchical model of human needs, the organization and the member work towards exercising joint responsibility towards satisfying their mutual and respective goals. Members are more functionally flexible and make greater efforts

to serve organizational interests beyond rigidly specified job descriptions. The organization, for its part, presumes that its interests are best served by helping its members fulfill their career goals and experience a sense of social support and security within the organization. As such, relocation stresses become a significant issue for the organization, and in such a model, the organization remains to some degree flexible in the type and degree of support provided to the relocating member and her family.

Whereas the human relations model seems the more caring and accommodating of the two, both systems would need to address the issue of relocation when the organization in question relies on the readiness and ability of its members to move to long-distance work sites. As Miller (1995, p. 214) points out, stressors in the family domain invariably spill over into the work domain.

Organizations characterized as highly bureaucratized and member relocating, such as the U.S. military, provide a wide range of relocating services, including family counseling. In such a system, however, the resources provided for assistance are clearly separate and distinct from those that service the organization's main goals. While the army often finances the renting of a commercially available trailer for relocating servicepersons, it does not permit the use of a military cargo truck for the same purpose.

Organizations that rely heavily on relocating personnel tend to be large. Many of these organizations also rely heavily on sophisticated communication systems in order to organize and coordinate their initiatives. The Internet is a popular communication network choice for international corporations. The Internet is fast, cheap, and efficient for both intraorganizational and interorganizational communication. In fact, the Internet developed as just such a tool for the military-industrial-academic complex. The following section addresses the individual organization member and the Internet.

The Internet and the Organizational Member

As we know, the Internet has evolved into a widely utilized tool for personal communication. This evolution has many organizations, especially industrial corporations, concerned over whether their members are using their organizational access to the Internet responsibly. Physical technological limitations of the Internet exist such that overuse of the network at certain locations can adversely affect information flow at those locations and, in certain circumstances, throughout the network at large. Personal use of the Internet at work is viewed by the management at many organizations as an unnecessary and unwarranted drain on communication resources. Managers are also concerned that access to fascinating Internet-based information resources, many with recreational and entertainment themes, can result in non-work-related Internet "surfing" (i.e., browsing and searching through multimedia Internet documents), which reduces productive work time. For the most part, private, personal electronic mail is considered to be a member benefit for those with organizational access. There are, however, notable exceptions in which organizations have monitored the electronic mail of their members or severely restricted mail usage to in-house or unidirectional modes.

Evaluations and predictions of what using the Internet means for the organizational member have ranged from the euphoric to the qualified to the dire. It is almost universally acknowledged that widely distributed networks increase the overall volume of information available to users. It is also the case, however, that the expectations placed upon information workers have increased, thereby initiating a "Red Queen" spiral named after Lewis Carroll's character whose subjects ran faster and faster only to find themselves slipping further and further behind. The rising popularity of e-mail, in addition to the practically nonexistent per-message cost, makes it easier for correspondents to send messages to one another and to groups of people. In turn, affiliation within a larger network of correspondents means a greater number of incoming messages. Again, the technological development increases expectations, not only on the tool, but on the user as well.

The affordability of computer equipment and the capability of users to access the Internet from literally anyplace with a telephone make it possible for many information workers to perform their jobs outside of a geographically centralized workplace. This concept of "telecommuting" is heralded by some as personally emancipating because the time, expense, and fatigue associated with travel can be minimized. Critical theorists, however, see the possibility of capitalist interests obliterating the temporal and spatial boundaries between work and leisure spheres of a person's life.

In this deliberation, we do not presume that the potential for ubiquitous networked human communication necessarily translates into the nightmare of capitalist excess. It must be remembered that McLuhan's initial concept of technological determinism held that social processes and values determine the application of technology and help determine its course, just as technology simultaneously influences the development of human values. For the purposes of the work in question, we take the phenomenon of computer-mediated communication (CMC) as a given and focus on the application of the technology for its potential social benefits.

Media Theory and the Internet

In the early days of media studies, strong effects were presumed and tested. Later, in the forties and fifties, the failure in the verification of strong effects theories led to theories stating that media had minimal effects on human beings. The sixties and seventies, in part because of the pervasive feeling that mass media influenced social phenomena, including the civil rights and anti-Vietnam War movements, came to be known as the era of conditional effects. In other words, under certain conditions, mediated messages have the potential to influence wide-ranging social change. The "uses and gratifications" approach (Blumler & Katz, 1974; McQuail, 1984; McQuail, 1987) is a conditional effects paradigm.

The theoretical perspective of uses and gratifications holds that different media help individuals to satisfy certain human needs. Whereas previous theory presumed the audience member to be "passive," or easily susceptible to media-based influences, uses and gratifications held that the audience member was "active" in her or his interaction with media artifacts. That is, it presumed that the media audience member was selective about what message he or she exposed him or herself to, how he or she perceived the message, and how he or she retained the message's content. In its original incarnation, the theory polled various populations to determine which media were used for what purposes. A typology of media-based needs presented by McQuail, Blumler, and Brown (1972) divides various media uses into categories of diversion (including escape and emotional release), personal relationships (including substitute companionship and social utility), personal identity (including personal reference, reality exploration, and value reinforcement), and environmental surveillance.

A major criticism leveled against this metatheory is that it did not really predict behavioral, attitudinal, or affective change. Moreover, it was inherently tautological since it was impossible to verify that any uses and gratification mechanism was in operation. In response, a modification of the metatheory makes the purported uses and gratification mechanism part of a process that in turn predicts a behavior. Hence the name of the new metatheory, "uses and effects." The uses and effects paradigm starts with a phenomenon of media use, explains or polls the purpose behind the user's motivation, and predicts a behavioral or attitudinal outcome that accompanies the concerted purpose and media usage.

Another criticism of the uses and gratifications approach was the very assumption that individual audience members actively and selectively processed mass-mediated information. Such opposition was understandable given the added dimensions of individual complexity that seriously calls into question the utility of the very concept of a social "mass." In the case of more personal public media, however, individual decision-making and selective-processing activity is not only a presumption but a systemic requirement of the technology's use.

The uses and effects approach allows us to pay close attention to the social context surrounding media use. The uses outlined by McQuail, Blumler, and Brown (1972) are, after all, social needs whose relative priority is dictated by the relationship between the individual and the social environment. A uses and gratifications model can help us to understand why families who are relocating use electronic mail and other Internet venues to satisfy various needs. Given the versatility of Internet formats vis-a-vis symbolic manipulation, it is likely that its uses are indeed quite varied and are likely to encroach on the domain of other media. For instance, it is not far-fetched to imagine that many individuals will choose to get their news on demand from CNN's Web site rather than wait for the top of the hour to get their headline information. It is also conceivable that many Internet users who previously wrote letters will choose to carry on their correspondence by e-mail, as long as their co-correspondents are "wired" into the Internet as well.

A uses and effects model can help us predict certain behavioral and affective outcomes when there is a lack of equilibrium between a media-oriented social need and its satisfaction.

Relocation and Internet-Based Support: A Theoretical Model

We have laid out the theoretical concepts of social information processing, family communication processes, the drive to reduce uncertainty, and the uses and effects perspective (which fits well with social evolutionary theory), and we have linked these issues with the phenomenon of relocation. What follows is a proposed theoretical examination of the uses and effects of e-mail upon relocating organizational members and their families.

Our theoretical unit of analysis is the family who is relocating. We begin with the following assumptions:

General Assumptions

- Families who are relocating are moving to a location whose social environment is new to them.
- Family members who are relocating are leaving a social environment in which they enjoyed a strong sense of identity and familiarity.
- Human community-based needs include social interaction/affiliation, social surveillance, social control/power, and social support.

Assumptions of Internet Electronic Mail Users

- Users understand basic functions of electronic mail and other Internet-based interpersonal forums.
- Families who are relocating who use e-mail are logistically able to correspond via e-mail to intimate others.

Theoretical Hypotheses to be Tested

- Characteristics of certain media allow them to better satisfy social communication needs associated with community membership. These characteristics include asynchronicity, interactivity, social network ubiquity, cost, and social presence. Families who are relocating will use e-mail to remain in contact with extended family and intimate others and will send messages on a more frequent basis than those who do not use e-mail.
- Families who are relocating will be more apt than families who are not relocating to adopt the technology as a way of maintaining social network ties with extended family and intimate others.
- When a particular family member has disproportionately more frequent, convenient access to e-mail, and extended family and intimate others have e-mail access, that family member will increasingly serve the function of communicative relationship maintenance.

  Concurrently, people who are "kinkeepers" in families will be motivated to secure e-mail access for use in the service of their kinkeeping functions.
- Applying theoretical principles of social presence and media richness, families who utilize e-mail combined with other channels and formats of interpersonal communication with extended family and intimate others will feel less socially isolated and less distant from the social network they leave behind than those who rely exclusively on any single channel.

Applied Research Methodology

Subject Selection

Our sample population will be limited to those whose relocation is either voluntary or sponsored to some extent by an organization, such as the military or a company. Pair-matching between families who are relocating and those who are not relocating will be utilized to avoid, as much as possible, spurious factors. Example populations include military families (especially in the United States), families of multinational corporate employees, and families of academics. This study is preliminary, and we do not presume that our sample will be comprehensively representative of all or even most families who are relocating. We do hope to develop a more refined model relating relocation with CMC use.

In evaluating our theoretical hypotheses, in both qualitative and quantitative senses, we will need to compare family units under several different conditions:

- Families who relocate and use e-mail for maintaining relational ties with extended family and intimate others left behind.

- Families who relocate and do not use e-mail for maintaining relational ties with extended family and intimate others left behind.
- Families who do not relocate and use e-mail for maintaining relational ties with extended family and intimate others.
- Families who do not relocate and do not use e-mail for maintaining relational ties with extended family and intimate others.

Measurements

Measurement data will be collected by personal interview and questionnaire as well as communication logbooks kept by subjects. Depending on future resources of this project, we hope to be able to actually analyze e-mail records of subjects who provide their informed consent. Measurement data will include the following items:

- Frequency of e-mail use.
- Extent of e-mail use for personal and work-related needs within an overall model of personal communication media use.
- Descriptions of social communication networks, categorized according to communication format and channel.
- Detailed information regarding reasons for the relocation.
- Detailed information regarding familiarity with the new location.
- Quality of Relationships Index (QRI) to measure social support of specific relationships (pre/post).
- Social Support Questionnaire (SSQ) to measure properties of the support network (post).
- Measures of feelings of social isolation.
- Organizational members' perceptions of the organization's consent, or lack thereof, for using organizational communication resources for personal reasons.
- Measurements (to be designed) of stresses related to coping in new and unfamiliar social environments.
- Measurements of social network maintenance tasks.
- If appropriate, official policy of sponsoring organization regarding personal e-mail use.
- If appropriate, official policy of sponsoring organization regarding relocation aid.

Conclusion

Our interactions in various social contexts continuously provide us with a sense of identity and security on many levels. And though it might seem that we can keep our different affiliations separate, we are information (and social information) processing animals of limited capacity. When we find it difficult to cope with one aspect of our lives, chances are that the affective stresses associated with the effort and the discouragement influence other aspects of functioning. Geographic relocation has always been a challenging source of stress, in large part because of the separation from networks of kinship and social support. This stress takes its toll on every family who relocates.

The growing trend of relocation has accompanied the development of communication technologies. If we consider the development of long-distance communication network technologies, from the messenger, to postal mail, to telegraph, to telephone and fax, to CMC, a trend towards increased social presence and immediacy emerges. We see the importance of frequency of contact as well as symbolic richness. It is possible to use the telephone to call our loved ones every day, but most of us feel that our immediate social and physical environments should take priority over distant social networks. CMC technology is being redefined as a personal distance communication tool, carving out its niche because of its relatively low drain on resources, its capability for facilitating one-to-one and group communication, its growing symbolic flexibility, and its speed.

Because CMC is a very new personal communication cluster for most of its users, it is important and useful to uncover the benefits and drawbacks for people who may rely on it the most for social and emotional support—the geographically distant members of social networks. Studying the use of new technologies will very likely tell us as much about where we as a networking species are going as it will tell us about where our technology is going.

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Early Adolescent Social Networks and Computer Use

Myron Orleans & Margaret C. Laney ■

Abstract

A research project was conducted that examined the interactions between the social networks of young adolescents and their computer usage. Particular attention was focused upon whether computers tend to isolate youthful users. Adult anxiety regarding the damaging effects of computers on children was assessed. Parental involvement, orientation to computers, and gender were the main variables studied. A case study approach was employed to gather observational data regarding the variety of interactional networks that framed the computer experience of a convenience sample of 32 subjects. The data were analyzed in terms of the reflexive co-construction of computer-oriented behaviors and their social interactions. The findings challenged the notion that heavy youthful computer users experience social isolation. Rather it was found that the interpersonal lives and computer activities of early adolescents reflexively amplified each other. Lower involvement of parents resulted in higher rates of peer socialization. Computer gaming was found to promote sociation under certain conditions. Online communication led to interpersonal communication in the presence of preexisting peer relations. It was found that boys were more likely to socialize in relation to computers than were girls. The data were explained as consequences of context and gender-based differentiated styles of world-creating activity. Recommendations were made to parents encouraging a less fearful outlook on computers. Suggestions were offered on how teachers and parents may foster the integrative and developmental use of computers.

■

Introduction

Popular and scholarly discussion of children and computers has generally lauded the educational benefits of home computers for children (Schall & Skeele, 1995; Williams, 1994). Perhaps 40% of the children in the United States have regular access to a home computer, and while usage varies, parents generally expect that their children need to use and will use a computer regularly (Green, 1996). At the same time, however, concern has been expressed regarding the possible isolating effects of computers on children. Consideration of the presumed nonsocial nature of computers has led some to conclude that regardless of instrumental benefits, excessive preoccupation with computers may pose a danger to adults as well as to children (Kupfer, 1995; Stoeltje, 1996).

Children's use of computers may affect their personal lives, family relationships, and peer adjustment. Since computers constitute a significant and growing proportion of children's lives (Welch, 1995), it is not surprising that concerns have addressed the possibility that children will experience a diminution of social relationships. Fears have been expressed that children's physical, personal, and social development will be impaired by excessive computer usage (Dorman, 1997; Miller, 1993).

Fear of the isolating effects of technology is not new, nor has it escaped the attention of researchers (Talbott, 1995; Turkle, 1995). Media critics have frequently proclaimed that television, music, video games, as well as computer games, have reduced children's social interaction (Hanson & Maxcy, 1996; Smith, 1995). Personal computers may have now taken over television's prominent position as the newest, feared piece of technology in the home (Coffey & Stipp, 1997). The anxiety felt by some adults has not apparently impacted the teenagers themselves who seem to view the technology favorably ("Teenagers and Technology," 1997).

Parental dread of children's computer misuse is further enhanced by distorted media depictions. For example, a popular movie, *Hackers* (Wickstrom, 1996), portrays adolescents as cyberjunkies who compromise banking procedures, change television programming, and twist government policies, but who do not participate in sports and barely associate with anyone outside their computer-related culture, including their families. Magazines and newspapers have also contributed to the environment of anxiety with articles such as "Child Molesters on the Internet" (Trebilcock, 1997), "Snared by the Net" (Rogers et al., 1997), "Internet Dangers (How to Protect Our Children)" (Rubenstein, 1996), and "Are We Creating Internet Introverts? Culture: Our Children Need to be in the Real World" (Shulman, 1996).

An assumption behind this critique of children's computer use is that a limited reservoir of time and energy is available to devote either to social or to "nonsocial" technological involvements. Zero sum thinking posits that technological activities necessarily reduce sociation because they sap time and energy. This approach fears the loss of the self and the social to the technology (Kupfer, 1995; Stoeltje, 1996).

Alternative conceptualizations utilized in this paper suggest that computers may actually promote certain kinds of sociations (Wellman, Salaff, & Dimitrova, 1996). Technology, in this view, may create occasions for social interaction and serve as topics of discourse. Rather than posit computer technology and social interaction as mutually exclusive options, this way of thinking poses the possibility of reciprocal and reflexive interplay between the two phenomena (Leeds-Hurwitz, 1995; Pearce, 1994). Computer use may be thus thought of as a possible foundation for social interaction as well as its product.

Specifically, this paper will offer a series of observations of early adolescent computer users, each of which illustrates kinds of children's sociation. Young computer users were observed in a variety of home contexts in order to depict diverse conditions. These observations were used to describe and analyze the patterned computer-related actions and interactions of the subjects. This kind of data does not permit empirical generalizations as to the proportion of children whose social life is enhanced versus the proportion whose social life is diminished by computer use. Rather the observational data permit the description of interactional patterns under varying conditions. These conditions include parental involvement, orientations to computers, gender, degree of peer integration, computer sophistication, and other variables.

Parents are likely to be important insofar as they configure their child's computer and establish parameters. Computational power and software capabilities are usually parental prerogatives related to their financial situation and their purposes in providing the child with computer access. A curvilinear relationship may well exist in which higher and lower levels of parental involvement either precludes preadolescent sociation or renders it unlikely. In the former, the parent might do so much for the youngster that he or she may just play the game or use the program set up by the parent. In the latter scenario, the computer may never be turned on for lack of guidance. Moderate amounts of parental consultation along with encouragement toward autonomy may predict the greatest likelihood of sociation derived from computer use.

Different orientations to computer use are likely to be associated with the quality and frequency of social interaction of early adolescents. For example, some young adolescents may use computers as tools of personal empowerment (Orleans & Walters, 1996). They may use the computer for self-expression, information access and productivity enhancement, and to demonstrate mastery of a complex technology. The functionalization of the child's personal computer in this scenario may impel him or her to try new computer activities, program, resolve problems, and continuously upgrade. While ego enhancement may drive some to do it all on their own, it is more likely that regular consultations with experienced peers would help early adolescent computer users become aware of new software, programming approaches, and trouble-shooting techniques. Thus, sociation may be promoted to the extent that the desire to perfect one's personal computer motivates the user to seek sophisticated assistance.

Children likely spend a great deal of time directly playing games against their computer. But gamers, especially adolescents, often get together to play computer games (Buchman & Funk, 1996). Increasingly, gamers are networked either in actual networks or via modems. Online services are offering gamers opportunities to play via their

proprietary services or at Internet sites. Game installations, including consultations providing technical support, sharing, shortcuts, codes, achievements, and ways of improving scores, may promote sociation. Thus, to the extent that gaming implicates others, the surround of game playing poses a possibility of social interaction.

While the online world may appear to some as a substitute for interpersonal communication, a virtual sociality that provides only a false sense of connection, it affords many opportunities for children to genuinely interact. Young adolescents may discuss the benefits of e-mailing, chatting, Web surfing, and the like. They can convince their own and peers' parents to allow online access, help each other to get online, share favorite sites, compare different plugins, discuss technical matters, and offer support for each other's online ventures. Since many young adolescents do not have their own computers, they may gather in groups to share online access. Additionally, some children may find it more fun to go online together even if they have their own systems. Thus, virtual social worlds and actual sociality can reciprocally coexist.

The characteristics of early adolescent gender-based groups impact sociation experiences (Lever, 1988; Fine, 1988). Research on male groups suggests that activities and tasks constitute the prime focus of interactions. Communication regarding computers would seem to meet the standards exemplified in male groupings. There may well be an affinity between male sociation patterns and interaction concerning computers (D'Amico, Baron, & Sissons, 1995; Kinnear, 1995; Whitley, 1997). Since female groups have been found to be more oriented toward socializing itself rather than toward activities or tasks, it may be less likely for female adolescents to use computer issues as a resource for sociation. On the other hand, computer involvement might prove less likely to produce isolation among young females because of their direct orientation toward sociability. Thus, gender may impact computer-related sociation of early adolescents in four ways: (1) isolate males who are not involved in computer support social groupings, (2) integrate males who use computer-related communications as grounds for sociation, (3) somewhat reduce female sociation by promoting individual computer activities, or (4) somewhat promote female sociation if females seek social support for their computer activities.

This paper explores parental involvement in their child's computing, how the child uses the computer, and how gender affects the patterns of sociation children experience in relation to computing. It is predicted that the circumstances of computer use rather than the technology itself influence the degree and type of sociation experienced. It is further anticipated that computing and social activities reflexively operate under some conditions to produce enriched interactional opportunities. These conditions will be examined in detail, but it is expected that moderate levels of child autonomy, striving for computer mastery, networked computing, group legitimation of computer activities, and gender will affect the social dimension of computer use.

Method

Sample

The researchers selected a convenience sample of early adolescents that included their own children, their children's friends, and their friends' children. The researchers selected subjects in terms of their availability for extended observation under a variety of circumstances. These circumstances arose in the natural course of home life and presumably reflected typical conditions under which the subjects used computers. It was hoped that this selection technique would yield richer observational data than that of a more scientifically selected sample.

A total of 32 children were observed in home settings, usually on three occasions for an average of about one hour each. Children were observed as they did computer work on their own and with others. The children ranged in ages from 8 to 17 with a mode of 14 years. The families of the children could all be classified as middle income. Twenty-six were European American children, and the remainder were Asian, Mexican, and African American children. Eleven were female, and all of these were European American.

Procedure

The subjects were observed in the natural settings of their home environments as they spontaneously used computers for their own purposes. The subjects were not informed that they were specifically being studied in terms of the social dimensions of their computer use, but they were informed that a research project was being conducted, and they or their parents did provide

consent. The subjects did not know or appear to care about the purposes of the investigation.

The researchers asked the subjects if they could "hang around" while the subjects used their computers. The researchers lounged in the room, remaining quiet for the most part. They did talk sometimes in order to account for their presence. They walked in and out of the computer room occasionally, visited with other adults in the home briefly, and even did some "housework" to relax the subjects and promote a casual atmosphere. Detailed notes were written down after the observational period was ended.

Instrumentation

The researchers followed an explicit protocol requiring them to observe the communicative behaviors of the young subjects while they were computing. Communicative behavior was defined as any act in which meanings were shared interpersonally. The researchers were particularly alert for opportunities to study kinds of circumstances that elicited social involvements. Groups of subjects were observed in terms of the content of their sociation to measure the influence of the computer as a factor in their interaction. Topics of talk, sequences of speech acts, and interaction chains of talk were noted and analyzed after each observational occasion. The format of the subjects' communication was also examined in terms of the implicit rules and procedures used. Turn taking, lengths of speeches, pauses, listening behavior, and leave-taking techniques were also noted.

The subjects' computing behavior was closely observed. Distance from face to monitor, intensity of focus, nonverbal expressions, use of keyboard and mouse, manipulation of physical objects, such as diskettes and CD-ROMs, and virtual objects on the monitor were scrutinized. How frustrations were expressed was of particular concern, and close attention was paid to the circumstances under which help was sought and from whom. Specific attention was given to how the subjects produced their conversations, how they created a meaningful sense of their computer actions, and how their speech acts shaped their computer-situated identities. Since both individual computing behavior and social computing behavior were observed, comparisons could be made of the relative satisfactions derived from each type of computing activity.

Interpretation

The resulting qualitative data were analyzed from a symbolic interactionist/social constructionist approach (Leeds-Hurwitz, 1995; Pearce, 1994). Concepts such as significant gesture, meaningful symbol, social cues, and meaningful interaction derived from the former were used to examine the process of sociation (Blumer, 1969). Social constructionist notions of reflexivity, reality definition, meaning creation, and internalization/externalization served as the backdrop for the explicit analysis of how the social interaction of early adolescents is affected by computers (Orleans, 1991).

Findings

Parental Involvement

Perhaps the most computer-pervasive home observed was one in which the father, who worked for a computer company, had a personal computer and laptop computer in the bonus room over the garage, and had purchased a computer for each of his three daughters, ages 10, 14, and 16. He had connected all the computers to a phone line, and all the computers had a modem and access to online systems. The father taught his daughters how to use their computers. As his daughters became computer literate, he spent less time with them while they were using their computers unless they needed help, which was rare. Computers, however, remained a topic of face-to-face communication when they were not in use. The father, having set up the girls' computers, reduced his involvement in their computer activities, allowing them to move to a level of comfortable involvement using their siblings as primary resources.

The 14-year-old seemed to display the highest level of commitment to the computer. She used her computer for schoolwork, mostly writing papers, and she played action/adventure games and a few learning games on her computer. Most of her computer time was devoted to participation in online chat rooms. She did not spend as much time as her sisters did on the telephone or with friends outside of the home. For her, socialization was mainly at school and at sporting events.

Her mother attributes the 14-year-old's high level of computer involvement and proclivity to socialize online to the fact that she had just started as a freshman at a new high school and had not yet established a new core of friends. The mother does

feel that the 14-year-old spends too much time on the computer, but the mother appears to accept this behavior as a mode of adaptation to transitional circumstances. Her tolerance gives the daughter tacit permission to emphasize virtual sociality. The parameters for computer use set by the parents encourage family interaction but also allow for some degree of isolation.

Another situation was observed in which a father configured the family computer and encouraged his two children, a 14-year-old son and an 11-year-old daughter. Since only one computer served the needs of all the family members, compromises had to be made. Each desktop was personalized under the direction of the father, and each child was set up with games and applications suitable to his and her needs. The children were observed to use the computer with some time conflicts and not very easy resolutions, but they were not observed troubleshooting or resolving problems on their own. The father took charge and dealt with issues as they arose.

Only sporadic sociation was observed of these two children and their friends. On one occasion, a profane version of a popular action game was introduced by one of the son's friends. The father noticed the activity around the computer and insisted on setting up the game to avoid configuration problems, even though he appeared to disapprove of the content. While the game was successfully installed, the son and his friend were distracted and engaged in other pursuits. Thus, the father's enmeshment precluded the computer serving as a resource in developing a stronger family bond.

Later on, it was noted that the father purchased a laptop for his son. After some initial sparring regarding who would take responsibility for the computer, the son established himself as being fully in charge of his own computer, denying the father any access to it whatsoever. Subsequently, by using online communication and interpersonal interaction, the son mastered the computer for his own purposes, principally online access. Groups of friends, once as many as four, visited him, or more precisely his computer, to get online and explore whatever resources and gain the experiences they wanted without the father's intrusion.

The daughter was observed to play computer games and also engaged in online searches for items of common interest with two friends on different occasions. However, their activities were geared only to using existing applications. The father was uninvolved in the girls' computer use, thereby permitting their free and spontaneous interaction.

In another circumstance, a 14-year-old son of a divorced father was seen to be struggling with program installation and optimizing his computer. His father also used the computer for business and personal reasons, but he only knew how to run his own applications. This father neither directed nor monitored his son's computer use. On one occasion, two of the son's peers were observed offering help, jockeying for the keyboard position, and trying different techniques to resolve a problem. Eventually, the father called in a computer consultant to optimize the computer's memory for some games, but the boys did have an opportunity to interact regarding the problem.

In these limited instances of parental involvement in their children's computer use, what became apparent was that the greater the autonomy the child was given, the more social was his experience. No instances were observed in which a child did not use his or her computer at all because of lack of parental guidance. Indeed, parental guidance seemed to dampen children's sociation with peers. Given leeway, the young computer users seemed to be stimulated to seek support from and involvement with their peers.

An observed situation further confirmed this point. A 15-year-old male who was very active in scouting, school, and sports received a new PC after having owned an old Apple computer that he used just as a word processor. A friend came over to help him set up his computer. There was a great deal of interpersonal communication between the two boys. Conversational privilege was held by the boy helping the other to learn the capabilities of the new PC. The 15-year-old's father entered the conversation with many questions regarding his son's new computer. Both boys tried to help the father understand the computer and made him feel welcome in the conversation. In this case, the father's lack of knowledge facilitated not only peer interaction but father–son communication as well.

Child's Orientation to the Computer

Configuring the Computer. As noted in the above section, much of the socially discursive activities of the subjects concerned configuring the computer. A substantial amount of time of any computer user is

spent fiddling with the computer itself, customizing it, trying to get it to run a particular program the way the user desires, and optimizing its use of resources. This nonproductive work may itself account in part for the popular fascination with the technology. The very incompleteness of the computer requires a commitment on the part of the user. He or she must invest substantial time and energy in mastering the technology and using its power. While the gender dimension of this issue will be examined later, here it is imperative to delineate in some detail a circumstance under which the need to configure the computer provided an occasion for sociation.

Four males were observed while they were setting up and networking the eldest boy's new Nexstar 586 computer. Three of the boys were in their family residence, and the fourth was a friend. The youngest was 8 years old, the oldest was 17, and the other two were 14 and 15 years of age. The 15-year-old and 8-year-old were half brothers, and they shared a room rich in childhood technologies.

The delicacy of the operation matched the intricacy of the communications. Whoever sat at the keyboard dominated the conversation. Whenever one of the boys was programming the computer, his conversation consisted mainly of unemotional exchange of information. For the most part, the talk was pointed and functional.

The three older boys each proposed ways of accomplishing the task. Questions and information was provided in short, quick phrases. Assistance was only given when asked and was received without rejection or demeaning tone. The conversational bits were abbreviated but flowed smoothly, with no noticeable interruptions or breaks in communication. There was a definite harmony in the conversation both during times of relaxation and of problem solving.

The oldest boy, while transferring programs from one computer to another, demonstrated a particular power narrative: During this process, he seemed to gain high status in the conversation. He maintained that privilege by physically staying at the computer and calling to others to approach to talk. A situated identity and high rank was generated by this subject's computer activities and consequent communication gambit.

Group solidarity and boundary definitions were established through the use of computer-embedded language. Terms brought into the conversation from computer experience served to deepen the level of meaning. The 8-year-old was unable to relate to this kind of talk and withdrew. As their computer activities unfolded, the older boys magnified their interpersonal communication.

The communicative rituals for initiating and terminating pieces of conversation emulated the sounds for opening and closing computer programs. The audio indicators they set up for the computer to signal errors were also used in their talk to express disagreement or to highlight a speech error. Their communication was reflexive of their computer activities that created the meanings and understandings of the terminology they used while talking. Communicative competence and computer mastery operated to integrate the older boys while excluding the situationally incompetent 8-year-old.

There was little eye contact between the boys while working on the computer. All eyes focused intently on the monitor even though they talked with each other. Their ability to attend simultaneously to more than one channel of communication was quite noteworthy and may have benefited from their routine of conversing while computing. Face-to-face communication took place only when the computer was loading programs and there was no need to view the monitor. During these times, facial expressions and hand gestures were pronounced. There was a great deal of joking and emotional venting referring to television and movies to certify their communicative competence. The topics of their conversation pertained to past, present, and future computer experiences, but they essentially affirmed a common bond.

This case illustrates the reflexive, self-constituting process of sociation while computing. The boys were configuring their computer while producing and legitimating their social life. The features of their communication acts were quite conventional, especially for early adolescent males. Power, position, structure, acceptance, and rejection were subtly negotiated and achieved. A microsocial world was created that was itself a product of these computer activities and provided the context within which these computer activities occurred. Thus, the social dimension of computing in this case was inextricably bound to the computing acts themselves, demonstrating that computer configuration can be an opportunity for peer sociation.

One further observation offers data on how the effort to achieve personal mastery over the computer may lead to sociation. A 15-year-old boy was observed working alone on his computer and appeared to be struggling with a particular program. He did not come out of his room and ask anyone for help. He remained alone in his room and persevered through his problem. After completing his project, feeling gratified, the boy turned off his computer and came out to talk with his father. He told his father what he had done and what he had learned about the computer. Computer mastery in this case served as an opportunity for character development, discussion, and solidification of the father–son relationship.

Gaming. Not long after these four boys set up the new computer, they were observed playing games on the system. On this occasion, there was even more social banter than previously. Even though the boys rarely sat facing each other, there was a great amount of interpersonal communication. They discussed the games they were playing, experiences they had while playing other computer games, and what they were going to do next. When other family members entered the room, the boys verbally communicated with them, but their eyes remained glued to the monitor. Computer games served not only as a focus of social activity but as a topic of discourse and as a frame through which to view ordinary communication.

The social dimension of gaming was best exemplified when children were able to network computers and play interactively. Such a situation was observed in which two brothers, 11 and 15, and a visitor, a 13-year-old boy, played an action game on two networked computers in different rooms. At first, the younger brother pouted around his computer as the visitor played with the older brother. At this stage, there was little direct communication as the two older boys hunted for each other via the network. Once they were able to locate each other and started blasting, the younger brother excitedly ran between the rooms, sampling the different perspectives and mediating the event. He facilitated the interchange of perspectives, helping each to interpret and anticipate the actions of the other. While he seemed to somewhat favor his brother, he also appeared gratified at the success of the visiting boy.

At the conclusion of one phase of the game, all the boys congregated in the older boy's room to review and evaluate the game. The spontaneous and effusive rhetoric punctuated the event, providing an opportunity for rich, emotional exchanges with promises for more interplay. During this debriefing period, the boys' face-to-face talk flowed with effective turn taking, many pointed questions, and some responsive retorts. The game formed the backdrop for their talk, while the subjective experience of it constituted the theme of the conversation. They minutely reconstructed the events; the feelings felt at the moment of contact, threat, and attack; and the sense of impending doom or triumph as each foresaw his fate. They offered alternative strategies and posed future scenarios.

The younger brother was the first to initiate a new contest, volunteering this time with enthusiasm to serve as the go-between. This time around, the competitors did not even finish their game before they all ran into the connecting hallway to needle each other, joke about their relative positions in the game, and promise horrendous consequences for the opponent. The younger brother, anxious to regain his role, hustled his brother back to his station, and the game resumed.

Once this game was concluded, the brothers rotated positions. The older brother then coached the younger in his pursuit of the visitor, allowing him to make a few mistakes before urging him to take particular actions. The alternating sequence of combatants, consultations, and coaching continued for nearly 3 hours that evening, with only the slightest hint of fatigue creeping in just before the parents terminated the session.

The occasion began on a rather chilly basis with one computer less than the number of youngsters to play. The boys adapted to the circumstance, organized their own activity, and regulated themselves, each finding a favorite position while sharing. They engaged in heated and fruitful discourse, experiencing active communication that may have significant socialization benefit for all involved.

A 16-year-old male was observed in a number of circumstances in which computer game playing was a prominent feature. He used his computer primarily to play role-playing games with his friends in his room or in theirs. He was not observed to sit alone, read, or do very much homework. He spent most of his time on the computer with his friends.

Generally, there was a very high level of noise in the room. Blaring music from the radio or the television added to the excitement over their computer activities, forcing the boys to converse rather loudly. Turn taking was observed to not flow very smoothly. Each participant wanted to hold conversational privilege at the same time. Each sought to impress the others with his expertise regarding the game being played or previous games. While the quality of communication was limited, observation of this subject suggested that game playing might bring this otherwise reclusive young individual into some pattern of relationship. While it could be argued that computer game playing constrained this subject's life, one wonders how he would fare socially without the computer.

These observations reveal diverse conditions under which early adolescents play computer games and experience social relationships. The observations demonstrated a range of consequences of game playing including topical talk, framing, mediating, perspective interchange, role sharing, self-organization, reconstructed logics, strategic discourse, impression management, and the like. When the subjects' mundane computer activities are viewed as sophisticated collective accomplishments, the socialization gain derived from these activities can be substantial.

Online. An increasingly significant proportion of children's computer activity is spent online. The subjects in the current study generally spent 60 to 70% of their computer time online. This time was by no means socially isolated time. Online communication was usually not a substitute for interpersonal communication, rather both often occurred simultaneously.

During one observation, a group of four adolescent boys ages 13 to 15 gathered around a laptop while the one at the keyboard reviewed some of the things that he could do. The three other boys were unfamiliar with online chatting and asked the knowledgeable youngster to demonstrate what he had boasted about. He entered a chat room and immediately offered to trade pornographic images. Once a few trades were completed to the satisfaction of the onlookers, the keyboarder proceeded to obtain sound files of highly valued rock songs.

One of the onlookers asked to take over at the keyboard and tried to obtain cartoon picture files. The more experienced user, now hovering over him, instructed him on the necessary lingo to use in order to appear competent for the virtual social circle in the chat room. The other boys were impressed with the achievement of their peer and asked to participate similarly. Expressions of enthusiasm and admiration were exchanged as each in turn demonstrated some capability. The boys rated themselves in relation to the expert in terms of the effectiveness of their efforts and stated intentions to learn the techniques more precisely. The unselfconscious solidarity of the group of boys was noteworthy. They formed a task group, organized it according to skill-based criteria, and produced plans for further enrichment. Perhaps the particular pursuits of these boys would not gain the endorsement of adults, but the proficiency with which the boys created a computer study group and communicated about the technology suggests that collaborative online activities emerge readily among these adolescents.

A similar observation of two adolescent male friends revealed that online communication provided opportunities for the youngsters to manipulate the self and manage impressions. They were talking to each other on the phone and over the same bulletin board system with a third party they had just met online. The two pretended not to know each other online and enticed the third into playing a computer game over the modem. They also pretended to be visitors to the area and unfamiliar with computers. They asked the third for help on how to work certain systems. The boys had a fun time "suckering" the third. The observed subject exhibited highly animated facial expressions and body movements. The two verbally expressed their pleasure over the phone to each other, joking and touting the success of their deception. While the social ethics of this encounter may be questionable, the opportunity to try on a variety of personas is one of the attractions and hallmarks of online activity. This behavior can contribute to the development of social competency among adolescents.

A 16-year-old male was observed as he silently used the computer in the family room. He was just becoming familiar with the online world and haltingly sent e-mail and birthday greetings to relatives out of state. He took many breaks from the computer during which he spoke with others in the room about his online activities. He appeared very excited to be connected with others and magnified this sense by sharing it with others. Perhaps the

location of the computer in the family room, where so much relaxed discourse occurred, facilitated the family integration of the online computer-using adolescent. But this case suggests that online and interpersonal bonding may complement each other in certain circumstances.

Even when not using a computer for online activities, adolescents were observed to be using online access as a topic of conversation. During a car trip to a sports activity, three adolescent boys were overheard discussing online experiences. They particularly focused on Web sites that offered previews of computer games for downloading. One participant told how he was able to download an entire game for free from a site that no longer existed because of legal problems. The boys, not appreciating the issue of copyrights, were saddened to learn of the termination of the site. They also shared the addresses of sites that offered codes that permit movement between different levels of games, thereby avoiding the necessity to master each stage. They spoke of the relative benefit of diverse hacking programs and ways to obtain and enhance the more sophisticated ones. They concluded by eliciting promises from each other to exchange specific information and addresses via e-mail. While the morality of the conversation was certainly questionable, the boys did engage in a rather sophisticated conversation regarding online possibilities. They demonstrated the fluidity of youthful activities, indicating the inseparability of online communication and face-to-face communication.

Continuing this notion that communication for these youngsters did not fall into distinct categories, a 14-year-old was observed just after coming home from school, rushing to his computer, and getting online to communicate with peers he had just left. Online, they chatted in an obscure jargon about events and personalities experienced just prior at school. The online chatting served the same purpose as a telephone, but with the added dimension of launching the participants into wider arenas of communication. Right after the school topics were exhausted, the boys wandered into chat rooms and engaged in discourse with others as well as with each other.

This case and other instances belie the claim that online communication in a virtual world created on the computer draws young people away from actual communication in the real world. Indeed, it may be more accurate to contend that virtual and real communications reflexively construct each other. While either can occur without the other, they do in fact implicate each other for the adolescents described in this research. Thus, adolescents bring their everyday real world experience to bear upon their online virtual communication. Reflexively, they integrate their online life into their ordinary talk.

Gender. Far more of the instances cited above refer to male rather than to female adolescent socialization as a consequence of computer use. While the girls under observation demonstrated substantial personal capability with computers, it was comparatively rare to find girls sharing computer interests and activities. Most of the female subjects performed their computer actions alone, and computers did not discernibly enter into their conversations.

However, there were some instances of female sociation related to computers. A 10-year-old girl was observed to focus her friendship activity around her beanie baby collection. Two of her peers visited her room and rummaged through her holdings, checking for particular items. One pointed out that some important babies were missing. The girl had noticed that a Web page address was included on the tag of some of the babies and asked her father to help her get online to check for the availability of the missing baby. Once she found the page, she printed out the inventory and went about ordering the item. At the behest of her father, her 13-year-old-brother then helped his sister and her friends find a chat room organized around beanie babies. The girls experimented with computer chatting for awhile but soon abandoned this activity to return to playing together with the beanie babies. The girl was willing to use the online world functionally, that is, to shop, but did not choose to surf around and check out a variety of relevant sites, nor was she or her peers particularly entranced by the chat option. Her main interest was in the beanie babies rather than the technology that permitted broad exploration of different ways of relating. The communication with her peers did not center on the online access and, in fact, was not raised in subsequent conversation.

While many of the girls observed for this study displayed high levels of computer sophistication while spending time on the computer, their expertise was seldom heard to be a topic of conversation. A female, aged 12, was observed

over a period of time to assess the level of social interaction she experienced as a consequence of her computer activity. There were two computers in the home, one for her and one for her stepfather. She used her computer for browsing the shopping list on a commercial online service. She wrote her papers on the computer and e-mailed to out-of-state cousins. She frequently played games on the computer including one game with her parents. Her stepfather taught her how to use a money management program. But mostly, she used the computer alone in the den with no verbal communication with other family members. While she had comparable skills and access, she used the computer less than the boys. When friends came over, she rarely used the computer with them. They played outside on bikes or rollerblades, or in her room. Her computer usage was limited to weeknights after homework or when no friends were around to play with her on weekends. For this 12-year-old girl, the computer was a device that served certain personal needs and had some role in her relationship with her parents, but it had nothing to do with peer socialization.

Other female subjects who were similarly adept with the computer kept the computer separate from their social lives. The three sisters, ages 10, 14, and 16, discussed above, all used their computers effectively, but they spent a greater amount of their time socializing outside the home or on the telephone. Even the 14-year-old, who was the most consistent computer user among the sisters, did not mix her limited social life with her computer. While her 10-year-old sister was observed to spend her time on the computer mainly alone, she did talk to the computer and verbally shared things she learned on the computer with anyone in the family who happened to be around. The actions of the youngest sister suggested the impulse to use the computer as a basis for sociality, but this tendency was not carried forth either by her or her older sisters.

Another gender differential in computer use that was observed was that girls, unlike the boys, rarely played music or had the television turned on while on the computer. The girls also used their computers more for homework than did the boys, who were more likely to play computer games. With exceptions, the girls were more likely to be serious about using the computer. They were more focused on using the computer for particular purposes, and their demeanor while using it was more somber than the boys. The boys seemed more likely to view the computer as a multipurpose toy that was itself fun to use and integrated it into their social lives. However comfortable the girls appeared with the computer, it occupied a marginal position in their world, sometimes substituting for genuine social contact and sometimes provoking an urge to communicate. The girls, however, did not seem to feel that it was legitimate to allow computers to serve as a social theme.

Discussion

The observations reported above suggest that certain conditions are more likely to promote sociation in relation to computer use. Young adolescents whose parents were less involved in their child's computing were more likely to socialize. Parental involvement at the system setup stage related to greater computer commitment and sociation except in cases where more knowledgeable adolescents were able to collaborate with peers to set up systems without the involvement of their parents. Computer gaming may promote sociation when computers are networked or when games are either a subsidiary activity or a topic of talk. Online communication may promote sociation when adolescents search for commonly valued items, find opportunities for social experimentation, demonstrate knowledge and skills held in esteem by others, and when they seek to extend established interpersonal bonds. Finally, it was found that boys were more likely to socialize in relation to computers than were girls.

These findings were uncovered using a selected, small sample of early adolescents utilizing an informal observational protocol. These are tentative points demonstrating some possibilities. Further scientific study using larger samples and more objective methodologies needs to be undertaken to substantiate the conclusions of this study or to generalize. Nevertheless, these findings are intriguing and beg for explanation.

Although it was predicted that moderate parental involvement would result in the most socially fruitful use of computers, it was found that minimal parental involvement had the most salutary effect. These adolescent subjects sought to create their own social-computer world, gaining pride and a sense of community in the process. Parents were only desired when the subjects' own knowledge

was lacking or for recognition of an achievement. When they had the skill to personalize and customize the computer or network and empower themselves to carry out their own projects, the subjects seemed most interested in sharing their experience with peers. In this condition, they viewed the computer as their own product worthy of presentation to peers and a signification of their competency (Fine, 1988).

The subjects who socialized also sought to structure their collective experience around the computer, delimiting their boundaries for acceptance, regulating their own activities, and ranking themselves. Their prolific computer talk objectified the micro-world that they created, firmly legitimating it as a tangible world, worthy of its own language, ethics, and meanings (Berger & Luckmann, 1966). This world functioned best for them as an extension of other relationships but also as an accented dimension of those relationships.

For many of the girls who were observed, this kind of computer social world contradicted their taken-for-granted way of doing their normal business. That is, for them the ordinary world must prevail. The computer may be a useful tool, a transitional substitute for social bonding, but not something to take precedence over other aspects of their social life. Since their culture emphasized direct interpersonal contact and conversation regarding purely human phenomena, engagement with the computer as a prime focus of communication was not workable (D'Amico, Baron, & Sissons, 1995; Kinnear, 1995; Whitley, 1997).

That "boy culture" rather than "girl culture" permits the production of a computer-focused social world may have implications for the future, as computer expertise becomes the standard for achievement. Boys may gain or compound a competitive advantage as their culturally sanctioned avocation yields economically demanded skills. The development of computer skill among girls might well lag if it is based only on instrumental requirements. While the computer expertise of the girls observed in this study was substantial, the boys consistently devoted more time and energy to the computer. More importantly, the boys communicated about and thereby magnified their skills. Although the girls may have expressed pride in their achievements, computer skill communication was not a salient characteristic of their relationships.

Overall, it is clear that boys tend to socialize around the computer, while girls are more likely to do their computer work without compromising their sociality. Thus, for both sexes, there does not appear to be a diminution of social communication as a consequence of computer use. Indeed, there is some suggestion in this research that lack of computer knowledge hampers the ability of young people to engage in some forms of social discourse. Interactional skills, verbal facility, social identity formation, and group adjustment, particularly for the boys, were all positively associated with computer activity.

Since computers are prevalent in society, the economy, and the media, children who are only peripherally exposed to computers may be impaired not only occupationally but also socially in terms of today's conversations. Those adolescents, for whom the microsocial world of computers is an everyday experience, will more easily participate in macrosocial conversations regarding computers and related technological advances. The linkage between their interpersonal communication and the public policy discourse facilitates broader social integration. Rather than isolating adolescents, the social environment of computing may well prove to be adaptive.

Recommendations

Since this research did not find that computer use resulted in individual isolation and social decay, and in the absence of research that it does, it is recommended that the media abstain from emphasizing its dangers and threats to the common sensibility. Certainly, instilling fear and moral panic is more likely to sell copy than reassuring normalization; however, to pathologize computer use without adequate warrant does a serious disservice to our children and our future.

Certainly, parents need to be aware of their children's computer use. They need to be mindful that their own excessive involvement may rob the children of their chance for discovery and peer socialization. Parents would be well advised to allow their children the opportunity to enjoy the computer without dread of its putative dangers. Reasonable caveats and age-appropriate limits, along with wise selection of software, is likely to provide sufficient safeguards. Parents ought to be reassured that the computer is essentially a benign device, which certainly can be misused, but is most likely to prove of significant benefit. Indeed, since

computer and other informational technologies can promote family interaction, it is advised that families might focus more of their activities around computers (Kraut et al., 1996; Sun, 1995).

Children might be encouraged to view the computer as a social tool, with emphasis on networked capabilities and the need for a team approach. School administrators, parents, computer salespersons, and the like could be made more aware of the socializing benefits of computers for children (Porter, 1993). That is, instead of focusing on the computer as a means to promote individual productivity, the computer could be conceived as a component of a networked system, magnifying the power of each in the whole. School computer projects and outside assignments could be designed to promote collaboration (Schall & Skeele, 1995). Children would naturally gravitate to this network scheme and further their social benefit and preparation for the occupational world.

Similarly, the World Wide Web should be best understood in terms of a virtual social world intersecting infinitely with the actual social world. Our children are establishing their presence and communicating beyond their immediate social circles. They are discovering all sorts of representations of worlds within and beyond their familiarity and, one hopes, are producing their own representations. Collective efforts of adolescents to participate on the Web would seem to easily flow from their involvement. Sharing and communicating interpersonally about the Web and the Internet, in general, is strongly advised, even if some pursuits may not suit conventional tastes. In any case, the sparse verifiable examples of children lured away from home by online predators or atypical stories of children losing their souls to "cyberaddiction" should not dissuade parents and adults from supporting moderate and appropriate use of the Internet (Orleans, 1997; Young, 1996).

The key recommendation derived from this study is to encourage girls to socially accommodate to the computer. While the girl-culture emphasis on the human in social interaction is critically important, it should not exclude the use of computers as a focus of activity or as a topic of conversation. How to engineer this interaction is, of course, problematic, but games and computer activities that encourage social interaction will likely entice girls' participation (Thomas, 1996; Vail, 1997). But with the recognition that girl's athletic programs are growing rapidly, perhaps in spite of culturally rooted prejudices, and that girls are preparing to enter into many nonconventional occupations, it is possible that adolescent girls can be motivated to approach computers as a feature of their social lives.

In sum, recommendations are offered that promote the sociation of adolescents in relation to computers. We have presented the reality of this phenomenon and its benefits. It is likely that in the future computers will be more integrated into all of our lives. Dystopic visions of a fragmented social world resulting from computerization will only hamper our capacity to adapt. A more embracing approach, starting with our children, will enable us to successfully encounter the social challenges posed by new technology.

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Using Internet Resources to Strengthen Community Programs and Collaborations for Children, Youth, and Families At Risk

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Abstract

A New York State Cornell Cooperative Extension project for children, youth, and families is implementing electronic connectivity or Internet access to support the development of computer literacy among staff and program participants and to promote positive program outcomes in communities at risk. This paper is a progress report on the connectivity initiative. Reducing Risks and Increasing Capacity (RRIC) is a 5-year annually renewable Cooperative State Research Education and Extension Service (CSREES) and U.S. Department of Agriculture State Strengthening Project now in its fourth year of funding. The project supports eight targeted New York State community programs located in Chemung, Jefferson, Monroe, Oneida, Onondaga, Orange, St. Lawrence, and Tompkins counties; each program is led by a professional Extension educator. Through connectivity, volunteer and salaried educators can locate educational and other program and fund development resources. Internet access supports communication among multiple sites in a community project, among the eight New York State RRIC-targeted community programs, and across all parts of the RRIC project: community sites, the eight county community programs, and Cornell University. Electronic mail and listservs are used for communication and information sharing. Connectivity allows all sites and the state project staff to interact on sustainability issues. The project has ongoing formative and summative evaluation strategies in place, including evaluation of Internet use. The RRIC project strives to tap the potential of the Internet to strengthen program outcomes and to integrate technology, wherever possible, within the educational activities conducted. A baseline and a 1-year follow-up study were conducted on Internet use. Data on expectations of educators, volunteers, and collaborators for use of the Internet are reported. Preliminary results from the Year 1 follow-up survey include large gains in use of World Wide Web for program support and increased project communication. Experiences in designing and supporting the computer applications of the project are detailed.

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Introduction

A New York State Cornell Cooperative Extension project for children, youth, and families is implementing electronic connectivity or Internet access to support the development of computer literacy among staff and program participants and to promote positive program outcomes in communities at risk. This paper is a progress report on the connectivity initiative. Guided by the vision of strong families, competent kids, and caring communities, the Reducing Risks and Increasing Capacity (RRIC) project strengthens the organizational and local capacity of the Cornell Cooperative Extension system and its collaborators as they address the needs and issues facing families and youth in high-risk environments. RRIC has been critical to building stronger families and greater parent effectiveness, in addition to developing and strengthening assets in eight New York State communities.

Project Description

RRIC is a 5-year annually renewable Cooperative State Research Education and Extension Service (CSREES) and U.S. Department of Agriculture (USDA) State Strengthening Project now in its fourth year of funding. The project supports RRIC-targeted New York State community programs

located in Chemung, Jefferson, Monroe, Oneida, Onondaga, Orange, St. Lawrence, and Tompkins counties; each program is led by a professional Extension educator. Communities use two program delivery models—the Master-Teacher or natural volunteer leader model and the family support or home visitor model to reach at-risk children, youth, and families.

Through connectivity, volunteer and salaried educators can locate educational and other program and fund development resources. Internet access supports communication among multiple sites in a community project, among the eight New York State RRIC-targeted community programs, and across all parts of the RRIC project: community sites, the eight county community programs, and Cornell University. Electronic mail and listservs are used for communication and information sharing. Connectivity allows all sites and the state project staff to interact on sustainability issues. The project has ongoing formative and summative evaluation strategies in place, including evaluation of Internet use. While computer literacy in itself is a noble goal, the RRIC project strives to tap the potential of the Internet to strengthen program outcomes and to integrate technology, wherever possible, within the educational activities conducted. The first year of connectivity has, by necessity, focused on installing hardware and software and on training in computer and Internet literacy. The project has just begun to realize the programmatic benefits of connectivity.

Computers in Extension Community Education Programs

Computer and Internet use trends in formal or classroom education and in informal or Extension community education programming are similar. There are increasing numbers of desktop computers, improved access to the Internet, and incremental integration of computer applications in educational programs. A content analysis of trends in educational technology between October 1994 and September 1995 (Plotnick, 1996) included findings related to computer availability and applications. The literature studied revealed pervasive availability of computers in formal education settings, networking as the fastest growing application, policy groups advocating for use of technology in schools, and demands for teacher computer literacy. Eisenberg and Johnson (1996) acknowledged a widespread use of computer technology in schools and identified recent encouraging signs that computers are becoming more integrated into content areas rather than being taught in isolation. Cooperative Extension educators also seek to use the power of computer technology in their work.

During a transformational leadership workshop for western states' Extension staff, participants considered ways to serve and educate clientele in today's complex educational arena (Laughlin & Schmidt, 1995). Technology, including Internet access for both educators and learners, was seen as being convenient, supporting personal responsibility for learning, providing large amounts of information, and allowing time-shifting where learners participate at a time of their own convenience. Extension staff also saw the potential for technology to improve the connection and involvement of research programs in community education. Challenges identified included the need for maintenance of technology-delivered programs, the time investment required of learners, possible participant resistance, and fear of technology. In 1992, Oregon's Cooperative Extension and the Sea Grant program provided networking technical assistance and education to the Ocean Policy Advisory Council (OPAC), enabling members to draft policy recommendations to manage that state's portion of the nation's territorial sea (DeYoung, Harris, & Larsen, 1995). OPAC members accessed information and communicated across time and place via the network. The project principals suggested that the design and implementation of this policy education "virtual community" effort could be applied to other Extension program areas, including work with families, children, and youth. Steps to ensure success must address both contemporary program or content information and materials as well as technological support. The OPAC project upgraded hardware, provided software where necessary, provided toll-free telephone access to the Internet, and included a staff member for training and technical assistance.

Extension leaders also are looking to the Internet and the World Wide Web (WWW) to leverage dwindling support for the many resource materials available to citizens. Indiana Extension published the *Childhood Safety and Health Resource Guide* on the WWW in April of 1995 (Freeman, Whitman, Tormoehlen, & Embleton, 1997). The publication, produced since 1990, is a compilation of educational materials and organizations for use by educators and volunteers in community programming. Initially, the WWW version received limited

use. Results of a 1996 survey of Indiana county Extension professionals found that the majority were simply unaware of the resource and planned to access it in the future. Existing high costs of Internet access were also seen as a barrier. With additional publicity and the increased Web presence of related Indiana Extension projects and programs, the resource guide was accessed 425 times between April 1996 and March 1997.

Goode and Elliott (1992) surveyed 476 state, area, and county Mississippi Extension specialists, educators, and secretaries to determine the involvement of staff in computer applications and their perceptions about responsibility for staff development related to technology. Personnel with the most education and computer experience saw individualized study as more desirable than those persons with less experience. Most specialists, individuals with state or regional program responsibilities, saw themselves as being accountable for staying current. The researchers recommended that supervisors encourage county educators and secretaries to take more responsibility for their computer competence and to participate in training. They also urged that training resources be provided during and after work hours for learning and practice. While not unique to programming using computer applications, these experiences point out the importance of including staff training and ongoing technical assistance and internal and external program marketing for Extension efforts. Program publicity must be developed for educators and their learner audiences that describes the programs and resources available through computer technology. Learners may also need support via "help" documentation and access to educators, either by telephone or in person, if needed.

Extension community projects such as RRIC are intended to build community and individual learners' capacities through educational experiences. According to Schuler (1994), Internet visionaries and community activists all over the world are joining forces to develop community-oriented electronic networks in order to advance social goals, encourage community involvement in decision making, provide access to social services, and provide economic opportunities to disadvantaged, at-risk populations. Schuler believes that in order for the Internet to realize its potential, it will be important for those interested in community empowerment to adhere to a set of, what he calls, "guiding principles." Schuler defines these principles in terms of equal access, service, democracy, world community, and a "humanely" defined use of technology for the future. In Baym's (1995) study of sustained participation in computer-mediated communications, there is an emergence of a sense of expanded communities, with enhanced forms of expression, communication, and interaction based on shared group purpose and the "like-minds" of the participants. Most educators recognize the value of learners and educators being able to navigate in a computer environment, while the meaning of computer literacy is variable. To be democratic and empowering, the community education program with computer applications should support meaningful learner involvement. Educators do have a responsibility to develop a program's scope and sequence, including programs supported by computer technology. In Extension program development, this development is best done in partnership with the community educators and collaborators who deliver the program and with the learners or participants themselves. By designing computer-assisted educational experiences around the needs of the learner, Extension staff can support interaction among learners in groups, expand communication across localities, and build communities' cohesion.

RRIC Connectivity Implementation

The one-time electronic connectivity component in RRIC Project Year 3 is designed to provide Internet access for county-based staff and youth and adult program participants. Funders sought to promote access to the latest electronic information and educational materials and to move Extension and the larger society from a distributive information system to a system of creating access to information for all people (Cooperative State Research Education and Extension Service [CSREES], 1995). Connectivity was implemented to support projects' access to the National Extension Children, Youth, and Family Network (CYFERNet), *http://www.cyfernet.org,* as well as access to resources of other agencies and organizations to support program success and sustainability. Twenty-four personal computers were purchased or upgraded for the RRIC project. Each community project has at least two computers, one in the county Extension office and one or more in the community at a collaborating agency's or organization's site. Collaborators agree to provide access to

the computers first for program use by educators and participants and then for use to support other agency work. In addition, there are funds for training and technical assistance.

An information and technology coordinator oversees and implements several training and communication strategies to help make connectivity work in the RRIC project. Extension staff held three training sessions for the RRIC Extension staff and community collaborators. An electronic connectivity newsletter (*Hot Lines from Heidi*) goes to all staff and collaborators to help people merge connectivity into their programs. An RRIC Web page serves as a storage and browsing site for individuals and also gives information about other sites. (URL: *http://www.cce.cornell.edu/youth/rric/rric.html*).

"Telephone Talk" is a monthly telephone conference providing RRIC partners with the chance to ask burning technical questions, discuss an Internet topic of interest, ask for help in searching for resources on a topic of interest, provide feedback to Extension staff at the state level, and generally feel more "connected" to others across the project sites. Other support via telephone (and e-mail) makes up a large part of the day-to-day support given to various people in the project. Finally, an electronic listserv was set up to distribute the newsletter and to provide a means of cross-county communication.

The three training sessions covered orientation to Internet access and basic software use followed by more in-depth workshops. The first training session also provided the opportunity for the Extension electronic training educator to set up much, and sometimes all, of the hardware and software for each site in that county. Further training was provided to each of the sites by the RRIC information and technology coordinator. Participants in these training sessions received a more in-depth introduction to the Internet (e.g., SMTP, telnet, FTP), e-mail and mail servers (e.g., Eudora Pro, e-mail lists, netiquette), and the World Wide Web (e.g., URLs, Netscape 3.0, search engines, searching techniques, CYFERNet), with time for questions and answers and practice in searching. Participants also had the opportunity to share their Internet experience (if any) and engage in an "Internet Concerns" discussion. A national Extension Web training site has been useful in delivering staff development: Communicating Electronically—Internet Education for Children, Youth, and Family Life Professionals (URL: *http://www.cas.psu.edu/docs/cyfernet/cetrng.html*).

The information and technology coordinator also held two, Cornell-campus-based beginners' workshops on Web page creation for Extension staff and community collaborators. Participants learned how the Internet works and how browsers read documents that have been coded with HyperText Markup Language (HTML) tags, how to code electronic documents in HTML using word-processing software (Notepad) and an HTML editor (HomeSite 1.2), how to add graphics and pictures to their pages, and how to make links from their page to others on the Web.

Hot Lines from Heidi, the electronic connectivity newsletter, is a means of disseminating information on computing; the "Technology Tips" includes information on saving and storing e-mail messages, making signatures and e-mail filters, accessing electronic newsgroups, attaching documents to messages, making bookmark folders in Netscape, finding CCE-RRIC-L listserv messages on the RRIC Web page, and installing HTML editing software. All newsletter issues also have a section on useful Web sites on some "focus of interest" that came from the Extension staff or community collaborators' questions. Foci for this section have included these topics: sites for children, learning about the Internet, families and communities, work and employment information, parenting, "special events and special requests," diversity, computer and technology information, health and nutrition, government and activism, and CYFERNet resources.

A draft RRIC Web page was developed early in the connectivity initiative by students enrolled in an upper-level Cornell communications course. Now redesigned and maintained by the information and technology coordinator and an undergraduate work/study student, the RRIC Web page serves as a storage facility and browsing site for RRIC-involved individuals and also gives them information (including people pictures) about other sites (*http://www.cce.cornell.edu/youth/rric/rric.html*). Extension staff and community collaborators also recommend Web sites, and these are included in the newsletter and put up on the RRIC site in the appropriate category. As a result of training on WWW page creation, RRIC participants will be able to create their own sites, which will "live" on the larger RRIC Web site when completed. CCE-RRIC-L, an electronic listserv for the RRIC project, was

set up in February 1997 to distribute the electronic newsletter and to provide a means of cross-county communication. Although this listserv has not been used to its fullest potential, plans are in the making for increasing its use and relevance.

The "Telephone Talk" monthly telephone conferences, besides addressing specific questions from the sites, have covered these major topics: Introductions and Connectivity Status (January 1997), Children and Child Safety on the Internet (February), the RRIC Web Page—Planning (March), Gender and Technology Use (April), Internet Skills/Competencies (May), Online Chat (June), the World Wide Web (July), and Web Page Making (August and September). Ongoing technical support is provided through e-mail and telephone communication. For the Extension hardware specialist, phone support during 1996-1997 consisted mainly of talking Extension staff and community collaborators through reinstalling dial-up networking after they had "done something" to make it not work. This problem occurred about six times, with about an hour per caller to get the problem fixed. Calls also came in regarding network identification accounts and passwords that were simply lost or that had changed due to a change in Internet provider in that county. For the information and technology coordinator, phone support consists of helping to set up software preferences, e-mail filters, and attachment folders; to open attached documents from e-mail programs; and to download and install freeware (for HTML editing). The information and technology coordinator is often asked to help individuals use e-mail functions, find Web sites on a specific topic (e.g., evaluation or community development), make an e-mail mailbox and save mail, subscribe to an electronic mailing list, find a free counter for Web pages, and find instructor material for teaching Internet technologies to others. Telephone and e-mail together often provided a means for discussing programmatic strategy around connectivity as well.

Connectivity Progress

A baseline and a 1-year follow-up study were conducted on use of the Internet by Extension educators, program collaborators, and the program participants in the RRIC project. Partial results from the follow-up study are currently available. Participants were asked to complete the RRIC Connectivity Initiative Users' Perceptions and Expectations Survey before the beginning of each of the eight community orientation training sessions. State RRIC staff also completed the survey. A total of 59 respondents completed the baseline survey. At the start of the connectivity initiative, 73% of the respondents accessed computers more than once a week, while 16% used computers less than once a week or never. Only 14% of the respondents used the Web more than once a week, and 71% had never used the Web. Similarly, 59% of the respondents had never used e-mail, and only 25% used e-mail more than once a week.

However, respondents anticipated changing their use of computers as a result of being in the project (Table 1). The vast majority (91%) saw computers as an access tool to program resources and for project communication, and most also envisioned that adult (71%) and, to a slightly lesser extent, youth participants (62%) would use computers as well.

In keeping with the participatory nature of the RRIC project, we also asked how educators wished to use technology (Table 2). As with their perceptions about how use would change, the majority of respondents (90%) wanted to use computers as a program resource tool. They also identified the value of technology in finding answers to specific questions for program clients (83%). Importantly, over half wanted to use computers for recreation and to interact with others across time and location.

In general, community collaborator respondents saw the primary advantages of the connectivity initiative in terms of having greater opportunities for community networking, collaboration building, linking to university resources, sharing of program resources, and accessing information. Several of the community collaborator respondents also envisioned that the project would help make computer technology more available to other community members and thus "help to bridge the gap between the have's and the have not's." Some community collaborator respondents also reported that having computers would help them reach new audiences and provide improved or enhanced services to their present clients. For example, one community collaborator reported that the computer at her agency would be used to help community members improve their job skills and career opportunities. In sum, the community collaborator respondents expected that the primary advantages of computer technology would be to empower program participants, helping them feel more self-confident and thereby lessening the sense of

isolation experienced by many limited-resource families.

Table 1

Perception of Changes in Computer Use: Baseline Survey

Perceptions: How the use of computer technology may change	No. of respondents	Percentage of the total no. of respondents (n = 58)
Computers will be used more frequently as resource tools—for information, materials, learning, etc.	53	91%
Computers will be used more frequently for communication in RRIC, with other programs, organizations, resource people.	49	84%
Computers will be used by the youth involved in RRIC	36	62%
Computers will be used by the parents involved in RRIC	41	71%
Other: "Volunteers will access." "Computers will be used by neighbors."	2	3%

RRIC staff respondents reported that the primary advantage of having computer technology would be realized in terms of helping others in the community to become computer literate. They felt having access to computers would strengthen their linkages with community agencies and facilitate the sharing of program resources.

Similarly, Extension staff respondents expected that gains would be realized in terms of "co-learning" and strengthening relationships with community agencies. They envisioned (a) expanded community access in limited resource neighborhoods, (b) increased opportunities to share innovations and to network, and (c) an enhanced ability to locate both program-specific and educational materials. In addition, they saw expanded possibilities for workforce preparation, as well as opportunities for both computer and reading literacy development.

Almost all the community collaborator respondents reported that for the connectivity initiative to be successful, continuous support and ongoing technical assistance would be necessary. Several of the community collaborator respondents felt that in addition to ongoing training and the purchase of more computers, it would be important to have a contact person either at Cornell or at their local Extension office to answer questions. Another important issue raised by the community collaborator respondents was the need to market the connectivity initiative. As one respondent reported, "We must let the community know that we have connectivity and that it is available for their use." Several respondents emphasized the need to strengthen communications between the collaborators and the larger community. In order for the project to succeed, the community collaborator respondents perceive the following to be important benchmarks: (a) successful installation of computer hardware/software, (b) training and ongoing support for successful access/use of the Internet, (c) promotion of the availability of the computers within the communities agencies, and (d) possible upgrading of the computer hardware/software over time. One respondent summarized what is needed in order for the project to be successful: "Everyone who is a part of RRIC needs to work together and continue to keep the connectivity [project] up and running."

Table 2

Expectations for Computer Use: Baseline Survey

Expectations: How respondents would like to be able to use computer technology	No. of respondents	Percentage of the total no. of respondents (n = 58)
As a program resource tool	52	90%
To do research	41	71%
To find specific information for clients	48	83%
To communicate with others	49	84%
Just for fun!	38	66%
Go to an online "chat" room to discuss community issues	33	57%
Other (see below) [Extension Staff] To help expand clients' knowledge. [Extension Staff] Maybe create a Web page. [Extension Staff] To help others help themselves. [Collaborator] Assist in employment. [Collaborator] For a tool to continue my education. [Collaborator] To obtain recovery and 12-step information. [Collaborator] For us, I think it will be hard to stay within 100 hours per month! [Collaborator] As a tool to empower parents. [Program Participant] To be defined.	9	16%

The RRIC staff respondents agreed that ongoing support from campus would be necessary for the project to succeed. They suggested that it would also be important to provide additional and periodic training and to distribute suggestions and recommendations on how community agencies and program participants could use computers to become more comfortable and confident with them. This skill would help them meet the challenges faced by children, youth, and families in their homes, at work, and at school. The Extension staff respondents also perceived a need to "market the program through the media to draw attention to it." In addition, the Extension staff respondents echoed the other respondents in seeing the need for continued training; continued communication with campus computer support personnel; and ongoing dialogue with Extension Administration and campus resources on how computer technology might be used and is being used to improve the lives of children, youth, families, and communities.

When asked about what they hoped to gain from their participation in the connectivity initiative, the community collaborator respondents reported that they hoped (a) to increase their own computer skills; (b) to broaden their spectrum of contacts on various issues pertaining to family resiliency and support; and (c) to empower children, youth, and families by sharing access to information and computer skills with program participants.

Similarly, the RRIC staff respondents hoped to gain a "greater comfort level with computer technology and the ability to impart that to limited-resource families." The Extension staff respondents hoped (a) to improve their ability to access materials from the Internet and the World Wide Web, (b) to

increase their capacity to mentor new learners, (c) to discover ways to build collaborations via the Internet, and (d) to broaden access to resources and sharing of programs and ideas.

After 1 year and several cycles of training and ongoing technical assistance, we see good progress in the application of technology to our RRIC project and in the general development of computer literacy.

We created a short questionnaire, "Reflections on Using Computers in the RRIC Project." This questionnaire was designed to enrich our understanding of program participants' experiences using computer technology. Forty-eight surveys were administered. To date, we have received 20 responses—a response rate of 42%. Some of the preliminary findings based on these responses and a comparison to the baseline survey results are reported. Most respondents are the RRIC project staff. Collaborator respondents are less represented in the follow-up (Year 1), returns to date comprising only 15% of the sample (Table 3).

Table 3

Year 1 and Baseline Respondents (Preliminary)

Relationship to the RRIC project	Year 1: Percentage of the total no. of respondents (n = 20)	Baseline: Percentage of the total no. of respondents (n = 59)
Extension Staff	50%	29%
RRIC Staff	25%	5%
Community Collaborator	15%	53%
Program Participant	5%	10%
Other	5%	3%

Strong increases in computer use, suggesting both increased literacy and program application, are emerging (Table 4). Seventy percent of the respondents now (Year 1) report using a computer daily, and 20% report using one more than once a week—a total of 90% reporting use more than once a week, compared to 73% reporting use more than once a week at the start of the project.

Table 4

Year 1 and Baseline Computer Use (Preliminary)

Frequency of computer use	Year 1: Percentage of the total no. of respondents (n = 20)	Baseline: Percentage of the total no. of respondents (n = 59)
Daily	70%	[Not asked]
More than once per week	20%	73%
More than once per month	5%	10%
Less than once per month	5%	8%
Never	0%	8%

Much more dramatic is familiarity with and use of the Web (Table 5). After 1 year of the RRIC project, 55% reported WWW use more than once a week, while only 14% used the Web more than once a week previously.

Similarly, respondents are now using e-mail frequently (Table 6). Fifty-nine percent reported never using e-mail at the start of the project, and now a total of 85% use it more than once a week.

In order to gauge the extent to which the RRIC project has been successful in the connectivity initiative in terms of increasing program participants' computer skills, we asked respondents to describe themselves in relation to eight skills "BEFORE" becoming involved in the RRIC project and "TODAY" since being involved in RRIC. The respondents used a 5-point scale where 1 = very true of me; 2 = true of me; 3 = partly true of me; 4 = partly untrue of me; 5 = not true of me at all; and N/A = not applicable. For each of the eight skills there was a positive change in the direction of improving skill levels. Table 7 presents the preliminary results ($n = 20$).

Table 5

Year 1 and Baseline Use of World Wide Web (Preliminary)

Frequency of computer use	Year 1: Percentage of the total no. of respondents ($n = 20$)	Baseline: Percentage of the total no. of respondents ($n = 59$)
Daily	15%	[Not asked]
More than once per week	55%	14%
More than once per month	15%	5%
Less than once per month	15%	10%
Never	0%	71%

Table 6

Year 1 and Baseline E-mail Use (Preliminary)

Frequency of computer use	Year 1: Percentage of the total no. of respondents ($n = 20$)	Baseline: Percentage of the total no. of respondents ($n = 59$)
Daily	45%	[Not asked]
More than once per week	40%	25%
More than once per month	5%	8%
Less than once per month	5%	7%
Never	5%	59%

Next, we asked the respondents in Year 1 to indicate how often, on average, they accessed each of the five National Extension Networks (CYFERNet). The percentages in Table 8 represent the total number of respondents ($n = 20$) in each category of use.

During Year 1 of the connectivity initiative, we began distributing the electronic newsletter. Eighty-five percent of the respondents reported that they received the newsletter, and 94% found it "helpful" or "very helpful." In addition, we asked how helpful the monthly "Telephone Talks" with county collaborators and RRIC staff were. Sixty-seven percent rated them as "helpful" or "very helpful."

Early in the project, we recognized the need for computer technology training in conjunction with the connectivity initiative. The survey respondents indicated that 65% have participated in the introductory training session (summer 1996); 45% participated in the "Searching the Web and E-mail" training sessions; and 50% participated in the "Home Page" authoring and HTML training sessions (summer 1997).

Table 7

Participants' Computer Skill Development

BEFORE becoming involved in RRIC		**TODAY** since being involved in RRIC	
Variable	Mean (Std. Dev.)	Variable	Mean (Std. Dev.)
7a. I knew how to use a computer.	2.15 (1.35)	7a. I know how to use a computer.	1.70 (.80)
b. I used the World Wide Web to get information.	3.65 (1.31)	b. I use the World Wide Web to get information.	1.95 (1.00)
c. I used electronic mail (E-mail).	3.20 (1.70)	c. I use electronic mail (E-mail).	2.25 (2.22)
d. I used the computer as a tool for finding information, curriculum, resource materials, program activities, etc.	3.85 (1.46)	d. I use the computer as a tool for finding information, curriculum, resource materials, program activities, etc.	1.95 (1.10)
e. I used the computer to do research.	4.05 (1.32)	e. I use the computer to do research.	2.30 (1.34)
f. I used the computer to find specific information for program participants.	4.20 (1.15)	f. I use the computer to find specific information for program participants.	2.30 (1.22)
g. I used the computer to communicate with others interested in improving our community.	4.45 (1.05)	g. I use the computer to communicate with others interested in improving our community.	3.35 (1.50)
h. I used the computer to go "online" to discuss community issues.	4.80 (.70)	h. I use the computer to go "online" to discuss community issues.	3.95 (1.15)

Table 8

CYFERNet Access

National Network	Several times a week	About once a week	About once a month	Once or twice a year	Never
a. Child Care	10%	20%	25%	15%	30%
b. Family Resiliency	10%	30%	20%	15%	25%
c. Decisions for Health	0%	15%	20%	15%	30%
d. Science & Technology	0%	15%	35%	15%	35%
e. Collaboration	0%	20%	25%	15%	40%

When asked what types of future computer/Internet training were of interest to them, the respondents (n = 20) indicated interest in the following:

- 20%—Web page (HTML) training.
- 15%—Web page training on the editor "HomeSite."
- 70%—Computer maintenance and trouble-shooting.

- 50%—Internet training on special topics (e.g., downloading files and extensions or dealing with spams).
- 50%—Buying and using database software.
- 10%—Buying and using accounting software.
- 50%—Basic Windows 95 training.
- 20%—Other (e.g., PhotoShop software, publishing for families, learning how to make "Kids Books," and PowerPoint software for training presentations).

Respondents to the Year 1 survey identified these benefits of providing computer technology to community collaborators:

- computer literacy to more youth and adults who would otherwise not have access,
- breaking down isolation barriers, and
- learning skills that translate into becoming more employment-ready and marketable.

In order for connectivity to be successful, the respondents said that RRIC should:

- get more people involved, offer more trainings, more computers, expand the availability of computers; and
- provide easier access as well as get "mentors" to work more intensively with youth and adults.

Finally, when asked to reflect on personal gains by being involved in connectivity, the respondents volunteered comments such as:

- "I've improved my networking ability within and outside of the community. I've increased, broadened my knowledge of family issues and gained a sense of fulfillment by assisting families improve their lives and increase their self-sufficiency by working with them, long-term on broad family issues."
- "I've been able to assist community grassroots people in opening up new resources for their uses so that these people do not need to leave their neighborhood to connect with the world."
- "Before getting involved in this project, I had no knowledge of computers. I have gained a lot, and my new abilities have opened a new world of future programming for support in our city."

Describing Two Success Stories

The RRIC project can report important community outcomes in its fourth year of operation due in some part to the addition of the connectivity initiative. In Onondaga County, the RRIC project is strengthening grassroots projects in a neighborhood classified as the twelfth poorest in the nation. At one of the connectivity collaborator sites, the "Hayden Library" is providing a safe, secure environment for children and youth in a neighborhood where over 44% of the families live below the poverty level. This grassroots program has successfully integrated computer technology with traditional 4-H Club activities, teaching children nutrition, food safety, and plant and animal science curricula. There is evidence that 10 to 12 children who are participating in this program have gained computer skills, improved their reading ability, improved their school attendance, and improved their school grades. Importantly, this program has lessened the sense of isolation often experienced by those who live in poverty. The children and their families report feeling supported and connected to the larger community. This volunteer-run program is based in the home of a former teacher's aide. With only one computer and the support of county Extension staff, this program is transforming young lives. One child in the second grade did not know how to write his own name when he first came to Mrs. Hayden's home. Today, he is using the computer and encouraging his mother to learn with him.

Through the Tompkins County project, approximately 130 at-risk, inner-city youth (55% female, 45% male), ages 5 through 18, are involved in a wide variety of positive youth development activities. Adult community volunteers and agency collaborators act as informal trainers, mentors, and resources. Through this asset-based, empowerment model, youth assist in program development while building on the assets they already have. Youth are excited about themselves, their futures, and their community. Self-reports from parents indicate that there is evidence that the youth involved in this program have improved school grades and attendance. Youth have become active learners and are applying their newly acquired computer literacy skills (e.g., using the computers for homework, school projects, 4-H record keeping, and working at the Science Center). By helping to conduct a community needs assessment, the youth learned participation action research (PAR) skills

(e.g., data collection and analysis). Youth are now working on community issues identified through the needs assessment and are active in community development and policy-making projects. Youth are knowledgeable about local resources. They have learned job preparation skills (e.g., resume writing, interview skills) and have gotten summer jobs.

These programs follow an assets-based, ecological model with strong support from local community agencies and parents. Recent success in acquiring a Literacy Grant points to the sustainability of the program. There is evidence that in addition to gaining computer literacy skills the youth involved in these programs have learned and practiced skills such as reading, math, science, communication teamwork, problem solving, leadership, and community service. These youth have developed sustained positive relationships with their parents or other adults through participation in these programs.

Summary

Computer applications within an Extension education project for children, youth, and families in at-risk communities are beginning to provide evidence of positive learning outcomes. The project can attribute some of the program success to the use of computers and the Internet. At the same time, the project has realized gains in computer literacy for educators, collaborators, and program participants. As in previous Extension projects and in keeping with educational trends in general, successful use of computer applications requires attention to both the technology and the program content. The RRIC project team recommends that community education projects with connectivity form a partnership with local educators and collaborators and incorporate meaningful learner involvement. In this way, needs can be addressed for training, low-cost and convenient access, and relevant content. Ultimately the partnership should result in a democratic and empowering experience that strengthens communities.

Acknowledgments

This paper is based upon work supported by CSREES, U.S. Department of Agriculture, under special project #94-EYAR-1-2004 (Reducing Risks and Increasing Capacity—RRIC Project); Stephen Goggin, Project Director.

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Moral Development in the Information Age

Nancy Willard ■

Abstract

Families and schools must assume a leadership role in preparing youth for success in the emerging information age by teaching ethical online behavior in addition to academic skills. This paper presents a preliminary overview of moral development issues that are raised when young people interact in cyberspace. A preliminary classification system of Internet ethics issues that parents and educators must address includes (1) respect for property, (2) respect for territory and privacy, (3) respect for others and common courtesy, (4) respect for institution, and (5) respect for self. Based on preliminary analysis, there appear to be four factors that influence online behavior: (1) lack of affective feedback and remoteness of harm, (2) reduced fear of risk of detection and punishment, (3) a new environment with new rules, and (4) perceptions of social injustice and corruption. Moral development research explores moral reasoning, including cognitive-moral development and domain theory; moral motivation, including internal moral orientation; and moral control, including the social cognitive theory of moral thought and action and the theory of limited acceptable morality. This review of moral development research raises many questions including, ultimately, the question of whether humans, as a species, have the capacity to expand our moral reasoning, moral motivation, and moral control capabilities to deal with the complexities of the information age.

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Introduction

Families and schools must assume a leadership role in preparing youth for success in the emerging information age. This preparation goes beyond skills in mathematics, understanding of scientific principles, and effective writing. Preparation for success in the information age must include:

- Respect for the laws and standards that society has agreed upon for governing behavior related to the use of information technologies, including appropriate ways to work with others to change laws that are not in the best interests of society.
- Ability to engage in moral reasoning and decision making, especially when there are conflicts in values and interests.
- Moral motivation and self-control to engage in appropriate and ethical behavior, even in situations where there is the freedom to do otherwise.

This paper presents a preliminary overview of moral development issues that are raised when young people interact in cyberspace. Research in moral development, while not specifically addressing issues related to information technologies, brings insight to factors that affect behavior. This insight includes an understanding of (1) the underlying moral/cognitive development process and issues related to moral reasoning, (2) moral motivation and the role of empathy, and (3) the factors influencing moral control and behavior. The research provides a basis for initiating an analysis of issues raised through the use of information technologies and the Internet.

The Context

It is important to understand the context in which schools and families will be addressing moral development in the information age. The Internet, which can be viewed as a paradigm for the information technology environment, was created by the U.S. military to withstand a nuclear attack. To do so, the network technology was designed to function without centralized control and with the ability to route around technological barriers. This

"open systems" capability virtually guarantees that whenever a technological barrier is developed, the technology to get around this barrier follows shortly thereafter. The decision by the U.S. government to make the technology publicly available for international and commercial use has led to the rapid emergence of a global network of networks, transmitting massive amounts of data every second.

The bottom line is that while there will always be a role for laws and technical security and blocking systems, ultimately decisions about information sent or received and the activities engaged in through the use of information technologies will largely be controlled by *individual choice.*

The word "anarchy" comes to mind when considering the Internet. "Anarchy" comes from the Greek word "*anarchos,*" which means without a ruler or without leadership. The definitions provided for this word are seemingly in opposition.[1] The generally recognized definition of anarchy includes concepts of a state of lawlessness, disorder due to the absence of governmental authority, and confusion, chaos, and despair. But "anarchy" also refers to a Utopian or ideal society, with the absence of coercive government, built and managed instead through voluntary cooperative actions of individuals and groups. To achieve an ideal society in the absence of central control would necessarily require that the individuals within that society choose to act in accord with common values and with regard to their responsibilities to others.

Internet Ethics Issues and Concerns

The terms "Internet ethics," "cyberethics," "cyberlaw," "netiquette," "appropriate use," and others have been applied to discussions or analysis of the legal, ethical, and moral issues raised by this emergence of information technologies. It is helpful to more clearly define and categorize the kinds of behavioral issues that parents and educators must deal with as their children or students are going online. The following is a preliminary classification system of these issues:

- *Respect for Property.* Respect for property issues include: system security issues, such as computer hacking, and respect for intellectual property rights, such as copyrights.[2]
- *Respect for Territory and Privacy.* Respect for territory and privacy issues also include system security issues as well as the dissemination or gathering of private information.
- *Respect for Others and Common Courtesy.* Respect for others involves respectful communication and the avoidance of irresponsible speech. Irresponsible speech includes defamation, harassment, flaming or abusive language, and spamming.[3] A related problem is the use of e-mail forgery to disguise the source of the irresponsible speech.
- *Respect for Institution.* Respect for the institution addresses the use of a limited-purpose Internet account in accord with its limited purpose. The activities that are permitted through a particular Internet account may be restricted due to the source or institution providing that account, such as limited-purpose accounts provided by educational institutions and business or government employers.
- *Respect for Self.* Respect for self issues include those activities that generally do not have an impact on others but can be injurious to the self, such as addiction, personal safety, and "garbage" activities.[4]

Rationalizations for Inappropriate Use

The following are some sample common rationalizations for inappropriate use of information technologies and the Internet. These statements attempt to capture the essential ideas of the writings of the proponents of such rationalizations and comments made by individuals discussing these issues. They are presented to provide a framework for an initial analysis of the issues, pending more in-depth research.

Hacking

> "Companies and government agencies have no right keeping any information secret in the first place. I am a modern-day Robin Hood who will seek and disclose all examples of corruption and other bad acts by companies and government agencies."
>
> "I didn't actually 'break-in.' Breaking in is a 'locks and doors' concept that has no online equivalent."
>
> "I don't plan on taking anything. Copying information in electronic form is not taking because the original is left behind."

"By figuring out how to gain access to your system, my learning about computers has been enhanced. Everyone should be in support of increased learning."

"By gaining access to your system, I have demonstrated to you the deficiencies of your security protection. You should be grateful for this service I have provided."

Copyright Infringement

"Nobody ever gets caught."

"Everybody does it."

"This is not the same as stealing, because I really didn't take anything."

"Companies charge too much because they think everyone is copying, so I have already paid for extra copies."

"Bill Gates is so rich he isn't going to be hurt."

"I don't have the money to buy such expensive software."

"Information wants to be free."

Irresponsible Speech

"You can say anything you want on the Internet."

"You can't censor my free speech."

Four Key Factors

Based on a preliminary analysis, there appear to be four key factors that have an influence on behavior in the use of information technologies and the Internet. These include:

Lack of Affective Feedback and Remoteness from Harm

When people communicate or take some other action in cyberspace, they do not receive strong affective feedback about the hurtful impact of their communication or actions. Electronic text alone, without visual and auditory clues, provides little insight about the impact of communications or actions. Users of technology are also distanced from the potential harm they may cause by their actions. The intangible nature of cyberspace creates the impression that actions or words have no real impact.

Reduced Fear of Risk of Detection and Punishment

Negative consequences will only work as a deterrent to misbehavior if there is a high enough risk of detection and punishment. On the Internet, there is a reduced likelihood of detection and punishment for activities that are illegal or could lead to civil liability, much less actions that are merely unethical or rude. The Internet is simply not a "law-and-order" paradigm.

New Environment Means New Rules

Many rationalizations make the basic argument that "real-world" concepts and values do not have any standing in cyberspace. This issue must be evaluated carefully because we are moving into a new era that will require new rules. Basic values of respect for property and territory will likely continue to exist in the new era, but some of the rules and laws that accompany these values will need to be reshaped.[5] The need to reshape some rules and laws creates an environment that supports disregard for the underlying values.

Peer and authority support for new rules is a related factor. It is quite possible to find authority support for the proposition that it is or should be perfectly appropriate for people to break into computer systems or to engage in copyright infringement.[6]

Perceptions of Social Injustice and Corruption

Issues related to social injustice and corruption of business and government are frequently raised rationalizations for inappropriate behavior. For those who have the perception that they are the "have-nots" and that individuals or organizations who have power and wealth (the "haves") are corrupt or unjustly enriched, information technologies provide the means to even the score.

Moral Development Research Insight

The following is an analysis of moral development research that has been developed to serve as a preliminary framework for inquiry into information technology ethics issues.

Moral Reasoning

Cognitive-Moral Development. Kohlberg's (1984) theories on cognitive-moral development emerged from the cognitive development understandings introduced by Piaget (1965) together with Kantian concepts of justice that emerged from the work of Rawls (1971). On the basis of his research, Kohlberg identified six stages in the development of moral reasoning, grouped into three major levels. The progression through the stages reflects cognitive development in the understanding of

moral issues. The progression depends on the widening cognitive capacity to understand the perspective of others.

At the Preconventional Level, moral reasoning is characterized by a concrete, egocentric perspective. Individuals at the Conventional Level are gaining the ability to understand the perspectives of others and an understanding of the norms and laws that are necessary for society to function effectively. At the Postconventional Level, moral reasoning is based on an understanding of the principles of justice and social cooperation that underlie the norms and laws of society.

There appear to be two key concepts, rooted in a Kohlbergian framework, that will assist in developing an understanding of moral reasoning in the information age. The first is that young people construct their framework for reasoning about moral issues through their interactions with others, and these interactions are shaped by their level of cognitive development. This concept raises the need to consider what the impact of electronically mediated interactions will be on young people as they are in the process of constructing their moral reasoning framework. Early adolescence appears to be a time when young people who have online access become strongly interested in Internet communications. Their emerging moral framework is being developed in an environment where there is little affective feedback, where there is a reduced risk for authoritarian-delivered punishment but the potential for being ostracized as a consequence of inappropriate behavior, where individuals are judged on the basis of what they write and not who they are, where there is a constant need to authenticate information to determine its truthfulness, where there is a high level of interaction with people from throughout the world, and where there is the ability to act out different personae. The impact of interactions in this kind of an environment on the development of moral reasoning is unknown.

The second concept is that cross-cultural studies have found that less industrialized societies tend to have fewer individuals who reason at the higher stage levels (Snarey, 1985). A probable explanation is that individuals in societies that are not administratively complex do not need to engage in higher-level reasoning to ensure the orderly continuance of their society. An optimistic interpretation may be that individuals within a certain society gain the level of moral reasoning maturity that is necessary for their society to function effectively and that as the complexities of society increase, humans have the capability to expand their moral reasoning capacity to a level necessary to effectively sustain greater complexity. Society's transition into the information age may be the ultimate test of this hypothesis.

Domain Theory

Turiel's (1983) domain theory research focuses on the differences between concepts of moral values, social conventions, and personal choice. Moral values are categorical, universalizable, and structured by underlying conceptions of justice, rights, and welfare. Social conventions are arbitrary and agreed-upon uniformities in social behavior that are determined by the social system and that are alterable and context dependent. Personal choice issues are those issues that affect only the self. Some issues involve domain overlap; they are multifaceted issues that raise moral values as well as social conventions or personal choices (Nucci, 1989). Just as concepts of moral issues undergo development in accord with the cognitive development of the child, so does the understanding of social conventions.

Several key concepts from domain theory appear to have direct relevance to issues that are emerging in cyberspace. The first concept is that a key factor that appears to be relevant in distinguishing moral values from social conventions or personal choices is the determination of whether a certain action will result in harm to another. The second concept is that social conventions are context dependent and alterable. The third concept is domain overlap or multifaceted issues where an issue may raise moral values, social conventions, and personal choices. Actions taken in cyberspace are distanced from the resulting harm, and that distance may impair a person's ability to discern an underlying moral value. Our transition into the information age is resulting in changes in social conventions. Many issues related to the use of information technologies appear to be multifaceted issues. All of these concepts appear to be related to the difficult situation of discerning underlying moral values when social conventions are changing and it is difficult to perceive the resulting harm of actions taken.

Moral Motivation

Internal Moral Orientation. Hoffman (1991) has focused primarily on the internal moral orientation

and the role of empathy in moral motivation. Hoffman views empathy as the significant vehicle by which external or society-based norms become an internalized motivator of action, an internalized moral orientation. Empathic arousal is a trait that humans are born with. Empathy is connected with cognitive development; as humans gain greater abilities to perceive the perspectives of another, this insight also impacts their empathic response to the perceived distress of others. The underlying empathic disposition of individuals varies. Life experiences also affect the level of empathic awareness. Humans have the capacity for representation, and represented events can arouse an empathic response. The degree to which individuals actually have the ability for a representative empathic response (internalized empathy) varies. The internalization of an external moral norm occurs when a person feels an obligation to act in accord with the norm even in the absence of concern about being caught and punished if they do otherwise. Internalized empathy is the motivating force behind the internal moral orientation.

Hoffman's research has determined that the disciplinary approach used in response to a young person's transgression affects the internalization process. Discipline that is focused on how an individual's actions have affected another tends to support the internalization of empathy, whereas discipline that is rule and punishment oriented does not. Hoffman's findings are strongly supported by the work of Baumrind (1989) who investigated the impact of parenting styles. Baumrind has found that children of parents who attempt to inculcate conventional values through rules and punishment have difficulty in developing an autonomous sense of social responsibility. Children of parents who support their child's natural empathic response by explicitly confronting them about actions that may be harmful to others tend to have an active sense of social responsibility.

In light of these findings, it would appear that young people who have been disciplined in a manner that forces them to focus on the consequences of their actions and who have a well-developed sense of internalized empathy will be more likely to behave ethically in cyberspace, than those who have been raised in an authoritarian (rule-and-punishment) environment.

Moral Control

Social Cognitive Theory of Moral Thought and Action. Bandura (1991) has focused his research on an analysis of ways in which social factors and moral orientation combine to effect moral conduct. His research has focused on mechanisms by which internal control is selectively disengaged. Several key mechanisms that allow for disengagement have been identified. Those that appear most relevant to the use of information technologies are:

- *Moral justification*—the cognitive restructuring of an analysis of a situation that leads to support of immoral acts. Conduct is made personally and socially acceptable by portraying it as being for moral purposes, for example, fighting ruthless oppressors, saving humanity, self-defense, or, in the case of hacking, breaking into computers to find evidence of corruption by government or business. The changing social conventions in cyberspace appear to facilitate cognitive restructuring.
- *Disregarding, minimizing, or ignoring the consequences.* If the consequences of one's actions can be disregarded, minimized, or ignored, there is little reason for self-censure. Judgments and actions can be influenced by their proximity to resulting harm—people are more likely to cause or permit harm to occur when they are more remote from the victim of that harm. As we move into the information age, technology will continue to distance people from the harm resulting from their actions, thus facilitating the ability to disregard, minimize, or ignore the consequences.
- *Dehumanizing the victim.* The evaluation of injurious conduct partly depends on how the actor views the victim. To perceive another as a human activates an empathic response, but this response can be disengaged by dehumanizing the other. Technology can act to dehumanize others because of the lack of affective or tangible feedback.
- *Blaming the victim or environmental circumstances.* People rationalize inappropriate actions by viewing themselves as victims and their inappropriate actions as self-defense due to injurious conduct by another or being forced by the circumstances. Many of the social injustice and corruption rationalizations for inappropriate conduct related to the use of

technologies appear to contain attributes of blaming the victim.

Gibbs (1991), who works specifically with antisocial adolescents, reports processes similar to those found by Bandura. Gibbs held discussions with youth involved with juvenile justice systems. These discussions revealed that young people demonstrated a sociomoral developmental delay, that is, the persistence beyond childhood of egocentric bias that appeared to be supported by significant cognitive distortions of situations presented ("because I want it, it should be mine"). Gibbs also discovered what he termed rationalizations. The most common of these, externalization of blame ("the shopkeeper is at fault for shoplifting because he does not have effective monitoring") and mislabeling (serious vandalism is termed "a prank"), appeared to protect the individual from considering the factors that might restrict inappropriate behavior, such as empathy for the victim or dissonance with self-concept.

The rationalizations identified by Gibbs are somewhat understandable given that his subject population were youth involved with juvenile justice systems. What is not quite as understandable is why rationalizations in support of "innocent hacking" set forth by college professors (see endnote 6) are so similar in nature to those of juvenile delinquents.

Limited Acceptable Morality

Nisan (1991) has approached his analysis of moral control from a slightly different perspective. His theory of Limited Acceptable Morality is that humans strive for a moral balance—that we each have a personal moral ideal, but we are all willing, under certain circumstances, to waiver from that ideal. Individuals appear to set a limit on how far they are willing to waiver from the ideal, and this limit protects against unlimited transgressions. The boundaries of this limit vary according to the person. There are three factors that appear to support transgression:

- The transgression will not cause any perceptible harm.
- The harm is perceptible but small in comparison with the personal advantage gained.
- The harm is to the system, and no specific person sustains any loss.

Thus in Nisan's theory, the issue of the perception of the degree of harm caused is a critical factor that is weighed in decision making.

Questions

The review of moral development research raises some very significant and complicated questions.

- How will online interactions impact our young people as they are in the process of developing their moral reasoning framework?
- How can adults, who may have some difficulty keeping up with the technical competence of young people, effectively guide our young people in the development of a moral reasoning framework that is based on principles of justice, rights, and welfare?
- How do we recognize and act in accord with basic moral values when dealing with multifaceted issues in an environment where the social conventions components of these issues may be changing? How do we assist young people in doing so?
- How do we recognize and act in accord with basic moral values when it is difficult to recognize the moral development components of issues because of our distance from the resulting harm? How do we assist young people in doing so?
- How will reduced affective feedback when interacting in an electronic environment impact the internalization of empathy by our young people?
- How can we, as parents, teachers, and others working with youth, raise the level of internalized empathy and internal moral orientation of our young people so that their actions are guided internally?
- How do we increase the recognition of resulting distant harm caused by our actions? How do we assist young people in doing so?
- How do we increase internalized moral control of people who are participating in an environment that appears to effectively support a variety of mechanisms that allow disengagement of moral control?
- Does humankind have the capacity, as a species, to expand our moral reasoning, moral motivation, and moral control capabilities to deal with the complexities of the information age?

Endnotes

[1]See, for example, *Random House Webster's College Dictionary*. 1992.

[2]Losses due to computer hacking are estimated to be around $100 billion per year in the United States alone. According to estimates of the Software Publishers Association, as much as $3.3 billion of American software may be illegally copied and distributed in the United States.

[3]Spamming is posting an unwanted or annoying message to large numbers of people either through a discussion group or individual e-mail addresses. The term frequently refers to junk e-mail.

[4]Garbage activities involve accessing material that reflects the less desirable sides of humanity, such as pornography and hate literature. Virtually all teenagers can be expected to spend some time looking at this material, simply to find out for themselves what all of the fuss is about. Curiosity is, after all, a trait that is generally valued in society. The issue of concern is not whether young people will access this material, but what their reaction is to what they find. Of concern are the young people who find this material to be in accord with their values and return repeatedly.

[5]A good case in point is copyright law. The underlying value of copyright law is respect for the intellectual "property." Copyright laws provide protection for works created by an individual to enable that individual to reap a financial benefit that will reward his or her efforts. Society is benefited because such works are created. The past century has been dominated by broadcast media, acting as intermediaries between the creator and the recipient. The Internet will allow more direct communication between the creator and the recipient of the creative works. To the extent that copyright laws have been written for the protection of the broadcast media or other intermediaries, we can anticipate these laws will change (although not without complaint by the intermediaries). But the underlying value of respecting the rights of individuals to protect the results of their creative efforts is a basic value that should not change.

[6]In a standard text for use in computer science classes (Forester & Morrison, 1994), the authors state: "When a hacker gains access to a system and rummages around in a company's files without altering anything what damage has been caused? . . . Indeed, if the hacker informs the company of its lax security procedures, is he or she creating a public benefit by performing a service that the company otherwise might have to pay for?" (p. 99). "Given that more and more information about individuals is now being stored on computers, often without their knowledge or consent, is it not reassuring that some citizens are able to penetrate these databases to find out what is going on? Thus, it could be argued that hackers represent one way in which we can help avoid the creation of a more centralized, even totalitarian, government" (p. 84).

John Perry Barlow, former lyricist for the Grateful Dead and a founder of the Electronic Frontier Foundation has argued that intellectual property rights do not apply to digitized information such as computer software, e-mail messages, and Web pages. He argues that the fact that most people have copied software illegally "proves" that intellectual property laws are out of step with our moral intuitions (Barlow, n.d.).

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links

Barriers to parent involvement in education can be reduced, and parent–teacher communication enhanced, by exploiting new communications technologies in telephone systems and on the Internet. The speakers at the sessions in this strand addressed the use of technology for helping parents and teachers stay in closer touch (Jerold P. Bauch; Jay Blanchard; and Sharon Kristovich, Nancy B. Hertzog, and Marjorie Klein), how to close the gap between research and practice in educating children with disabilities (David Osher and Stephanie Snow), and ways to develop partnerships between schools, families, and communities (Beth S. Simon, Karen Clark Salinas, Joyce L. Epstein, and Mavis G. Sanders).

Not included in this section is the paper *ParentLink* presented by Vivian Murphy.

These presenters suggest that there already appears to be a body of evidence that supports using technology to create or strengthen home–school partnerships. The speakers believe that it is possible to use technology to develop and maintain such partnerships, and to use them to bring together the home, school, and community contexts in which all children grow and develop for the common purpose of helping students with their education.

Applications of Technology to Linking Schools, Families, and Students

Jerold P. Bauch ■

Abstract

Parent involvement is considered one of the most powerful means for improving schools and for increasing the satisfaction of parents and the community. However, barriers of time, schedules, and resources have put limits on effective parent involvement. To address these problems, telecommunications technology has been applied to increase parent–teacher interaction. Voice messaging ("voice mail") is now an established way to open schools to virtually all homes, using the telephone to assure easy connectivity. The Transparent School Model, the original plan for using these linkages, can produce a high level of school–home interaction and can give positive results in student performance and parent attitudes. New technology applications are also emerging, where computer devices in the home give access to the Web, the Internet, and other resources. As cable delivery and addressable set-top devices become more available, schools can become much more open to homes and the community. With a new integrated technology model to link schools, families, and students, the barriers and gaps can be reduced or eliminated. Parents could have their choice of several delivery channels, and teachers would be able to provide remote access to the learning experience of the child with modest additional time and energy. This paper looks into the near future at new means of information exchange between schools and homes while demonstrating the feasibility of using current technology to link teachers and families.

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Introduction

Children in many American schools can interact with children in other schools around the world using one of several linking strategies (e.g., e-mail, the Internet, fax, or even the ubiquitous telephone). But their families will never know that these exciting events happened unless the students tell them. Seigenthaler (1996) reminded us of the power and the potential: "With each new advancement, communications technology moves us closer to relationships with peoples and cultures across the globe" (p. xiii). The problem is that we are not using equally powerful strategies to communicate with the people across the street.

When parents ask their child "What did you do in school today?" it is because they sincerely want to know. It also shows that there is no easy access to the information from any other source. Of course, it is true that schools *try* to keep parents informed. But limitations of time, schedules, distance, and resources prevent school–home communication from being either *universal* or *comprehensive*. If there were universal links between schools and homes, every family would have easy access to information about their child's daily school experience. If the links were comprehensive, the family could learn exactly what it needed to know to provide a supportive learning environment at home. These conditions are available in only a few schools, but there is a clear need to build more effective partnerships between school and home (Comer, 1986; Epstein, 1992; Henderson & Berla, 1994).

In a recent poll of registered voters conducted by the National PTA, 94% said that educational progress depended on involving parents in the process. Other national surveys also show surprisingly high consensus that schools and homes

should increase interaction and collaboration. In 1997, the Gallup Poll reported that 86% of the general public believes that support from parents is the most important way to improve the schools (Rose, Gallup, & Elam, 1997). This attitude has been stable over the past decade. The 1984 Gallup Poll identified "lack of parental involvement" as the biggest problem facing the public schools (Ost, 1988).

The research literature agrees that effective parent involvement can be more effective than any other strategy for improving the schools ("School Reform and Parents," 1997). Henderson and Berla (1994) summarized more than 85 studies that document the profound benefits for schools, families, and students when parents participate in their children's education. Bill Gates of Microsoft emphasized the importance of this relationship when he stated: "The vision here is of a connected learning community. The connection between the school and the home is very valuable" (Gates, 1997). The power of the home was emphasized by Walberg (1984) in his review of 29 studies of school–parent programs. He found that family participation in education was *twice* as predictive of students' academic success as family socioeconomic status. Some of the more intensive programs had effects that were *10 times* greater than other factors.

When parents and teachers have rich and frequent communication, they can begin to forge the partnership that produces these benefits. The first step toward active participation for families is a common information base with schools.

This paper describes new uses of technology that can give schools, families, and students access to the same information on a regular basis. It then looks just around the corner at emerging technologies that have the potential to enrich the linkage. As we approach the turn of the century, it is vital that the barriers and gaps between schools and homes become much more permeable. The free flow of information can be accomplished through current and future connectivity, and the emergence of integrated strategies can improve the ways that teachers and family members exchange information (Kantor & Harrington, 1997).

The Recent Past

Voice Messaging for Parent Involvement

The first schoolwide applications of voice-messaging technology (commonly called voice mail) were developed in 1987 (Bauch, 1989; Ordovensky, 1989) and have been the dominant technology linkage in school–home communication. The first experiments resulted in a model that could be used in any school, and the plan was named the Transparent School Model. The name implies that we are using technology to make the school program "visible" to the parents, although the actual channel is voice, not vision.

On any given school day, the model works like this:

1. At the end of the day, the teacher reflects on the learning experience and writes a brief script for a message to parents.
2. The teacher picks up any (tone-based) phone and dials the school "hotline" number.
3. After entering his or her secure voice mailbox, the teacher records a 60- to 90-second message.
4. Parents may call the school "hotline" number and select the mailbox for their child's teacher or section.
5. After listening to the message, the parent has the option of leaving a response or question for the teacher.

When fully operational, every teacher has at least one voice mailbox and records a message every day describing the learning experiences of the group. The message includes a number of elements, including positive news from the classroom, explanation of content and concepts, specific homework assignments, and suggestions to parents.

The best applications also include the capability for the school to make automated calls *to* parents. In this process, an administrator or teacher records a message and selects the parents to be called. A general reminder about a parent meeting might be sent to all families, or a teacher might have the system call parents in one class with a schedule change or other nonroutine information. Schools use this "call-out" function to send good news home, for attendance or emergency notification, to promote other parent involvement, and for many other creative applications.

In the Transparent School Model, parents can call and listen to teachers' daily messages at any time from any phone. The school can also deliver phone messages to any combination of parents whenever necessary. Two-way communication is easy, and

time delay makes it extremely convenient. The technology makes every minute count, and count many times. The carefully crafted daily messages enable parents to take an active and influential role in their child's learning.

The Technology for Voice Messaging

Way back in 1987, our first trials used simple answering machines and separate phone lines to classrooms. Teachers simply recorded their messages where the "greeting" would be, and parents called a specific number for a teacher's message. This "Generation I" application also used a computer-based autodial card in the office computer to manage the outcalls. Although this configuration allowed us to identify and improve the functions for the model, the primitive technical systems were hardly satisfactory for use in all of the nation's schools.

Generation II followed quickly, where we experimented with more powerful voice mail from a central source. Service bureaus and phone companies had elaborate voice-mail capabilities, and the economies of scale were interesting. We found that schools were not comfortable with the abstract nature of service from a remote site and that voice-mail systems designed for large businesses had limited value in the school setting. Remote services also had difficulty in providing data on usage rates and other feedback to schools, which proved to be important as motivation for teacher use.

After several trials with the "remote server" configuration, integrated voice-messaging systems designed for school use in a PC platform were appearing on the market. These systems could be site-based, customized for the individual school, and had advantages in the messaging functions that schools wanted and needed. The best arrangement for these "Generation III" systems was to have one PC that managed all voice-mailbox functions and provided the automated outcall capability for a school. The systems collected and stored their own data on these functions and were a useful source of evaluation information on teacher and parent use. For example, if a teacher placed an automated outcall to members of the class, the system could display (and print) the results of the calling. The listing would show if any homes did not receive the message by indicating either "busy" or "no answer" in the report. Student information was organized in a database, and the calling list could be assembled with a few key strokes.

In Favor of Telephone Technology

Throughout the three-generation history of the Transparent School Model, we chose to use the telephone as the device for both teachers and parent users. The telephone had all the advantages of familiarity, easy use, and widespread availability. The computer-based voice-messaging systems that managed the communication were quite sophisticated and were relatively invisible to the users. In 1993, 94% of American households had telephones, and another 1.3% had easy access to a phone (Schement, 1994). With this "penetration" rate, we could approach the condition of *universal* communication between classrooms and homes. The presence of telephones in almost all homes reduced the possibility of technology inequity based on economic status—a serious problem with many other telecommunications approaches.

One small problem with the telephone as the input/output device is that teachers are the very last professionals to have one (Poirot & Robinson, 1994). The Transparent School Model does not *require* a phone in every classroom, but it would certainly improve the convenience for teachers. The new education rate (E-rate) discounts (Trotter, 1996; Vail, 1996; Brittain, 1997) should help schools add phones for school–home telecommunications.

Evaluation Outcomes

We have conducted a number of experiments, pilots, evaluations, and research studies on the use of voice-messaging technology for parent involvement. Many schools in diverse settings across the country have contributed data and been part of these studies that were supported by private foundations, telephone companies, and the business community.

Our first step was to establish a baseline on the nature and level of school–home interactions before putting the Transparent School Model in place. We sampled all contacts of all types for all teachers in each school over a 10-day period and found remarkable similarities from school to school. The mean number of parent contacts (all types) per teacher per day in America's schools ranged from 2.1 to 2.6. Two or three families had some interaction on a given day; the rest had none. This statistic translates into less than 10% of the families having even a casual interaction with their child's

teacher daily. The differences between schools were also in a narrow range, with high schools usually showing the lowest teacher–parent communication rates. In a relevant study of 1,032 parents, Marttila (1995) found that the median rate of parent–teacher conversations was 4.0 *per year.* The parents in that study also placed higher value on their roles supporting their child's learning *at home,* not school-based parent involvement.

After gathering "pretest" information on the nature and frequency of parent–teacher interactions, the model was put in place. When the technology was used by most or all teachers daily and the model was fully implemented, the daily exchange of information from school to homes often increased by 500 to 800%. In our most recent trial with more than 60 schools reporting data, the mean contact rate rose by 487% (Bauch, 1997). One of the school systems improved parent contact rates by 950%! It is now typical for about half of the families in the school community to call and listen to a teacher message every day. Schools that make extensive efforts to encourage parents to call have approached a calling rate where 75% of the families call daily.

Once schools fully implement the model, many of the other expected outcomes of improved communication appear. For example, teachers report higher homework completion rates. Homework completion allows more accurate grading and better grades, as the "zeros" disappear. Walberg, Paschal, and Weinstein (1985) showed much higher achievement when students complete homework. Another independent study showed a clear change in student grade point average (GPA) after installing a hotline (Fulk, 1993). There was a 22% reduction in the group that had very low GPAs (therefore reducing school failure) and a 22.6% increase in students who became eligible for academic honor roll designation. Fewer low-performing students and more students with high performance are exactly the kind of changes that are needed in every school.

There have been two controlled studies of student achievement—one in Tennessee and another in Indiana. In both, schools using the model were matched with schools that had very similar student/family/neighborhood demographics. After being assured that the "hotline" schools and the contrast schools had similar parent involvement histories, we compared school means on the California Achievement Test. In both cases, there were definite statistically significant differences in favor of the schools using the Transparent School Model. While we must be careful about attribution, it seems logical that when school–home communication jumps from under 10% to more than 50% per day, overall student performance will improve (Henderson & Berla, 1994; Moles, 1993).

Another important outcome area is parent attitudes. It seems apparent that as information flow between schools and homes grows, the attitudes of parents improve. This effect was documented by Ames, Khoju, and Watkins in the Johns Hopkins study of parent beliefs and attitudes (1993). The 1997 Gallup Poll confirms this relationship, indicating that the general public is more positive about the schools they know best. In our samples from many schools in diverse settings, parent attitudes became more positive as calling frequency increased. The "frequent callers" (three or more times per week) were almost six times more positive about the school and their child's performance than parents with little or no contact. The parents who received little or no information from the school tended to have attitudes that were neutral to negative. Parent support is a critical element in collaboration and positive community relationships and can be improved by simply providing easy access to accurate information about the school.

New Partnerships: The Bridge Project

After demonstrating quite clearly that voice-messaging technology can forge a new communication linkage for teachers, parents, and students, the model captured the interest of the business community. In 1995, the American Business Collaboration for Quality Dependent Care (ABC) adopted the Transparent School Model as a way to provide special benefits to employees with children in the schools. The ABC is made up of 22 "Champion," or lead, companies such as Allstate, Exxon, IBM, and Lucent. Acting through Boston-based Work/Family Directions (WFD), these large employers wanted a program that would improve school success while helping working parents increase their positive roles with their school-age children. The Bridge Project became a way for the employer to spend employee benefit funds to reduce family stress and contribute to the quality of education locally.

The Bridge Project Context

WFD helped designated communities acquire the technology and implement the project based on the original Transparent School Model. WFD also selected Homework Hotline Educational Services in competitive bidding as the vendor of the technology, installation, and training. In the first pilot round of the Bridge Project, 102 schools qualified, and each received an award of about $15,000 to fully implement the project. More than 85,000 families benefited from the program, and it received widespread media attention. Stories appeared on the *Today Show*, in national print media such as the *Christian Science Monitor*, and dozens of local outlets. In 1996, the project won the prestigious "Golden Apple" award from the U.S. Department of Education and *Working Mother* magazine. This new business/technology/school partnership is currently in an expansion mode, and new communities are being added.

Bridge Impact

Among the very positive results of the 1995-97 Bridge pilot period were the reactions from the working parents with children in project schools. About 87% of the employee families used the system during the first year of the project, and 78% were "satisfied" or "very satisfied" with the new services. Perhaps the best news was that once they found out that they had such easy access to vital school information, fully 89% of the parents wanted to keep the project as a regular way for schools to keep parents informed. An interesting concomitant effect was also found—over 70% of employees felt more positive about their employer for providing the model in their local schools.

Voice Messaging Prologue

With 2,000 to 3,000 schools using the functions of the original Transparent School Model or new Bridge Project configuration, and the high consistency of evaluation results, we have an effective strategy for using technology to link schools and homes. Voice messaging has the advantages of using a low-tech but ubiquitous device (the telephone) backed up by sophisticated computer-based technology. Other advantages are:

- instant ease of use (1 to 2 days from amateur to expert)
- application in any school in any setting
- extremely modest costs per unit of communication
- high convenience for both teacher and parent users
- time delay to match complex family schedules.

Since all surveys find that lack of time (e.g., Marttila, 1995) and mismatched schedules are the most serious barriers to better parent involvement, the model appears to transcend these deterrents.

Voice-based links using the telephone are likely to have a relatively long and durable future because most of the emerging technologies must wait for penetration of the home market before approaching universal applications. For example, the frantic expansion of Internet-based links is still years away from being universally available in homes (especially in low-income homes). The National Center for Educational Statistics reported that only 65% of schools had access in 1996 (Conte, 1997) and projected that access would reach 95% by the year 2000. But availability of service in school does not assure the connection to homes. Jupiter Communications (1997) estimated that only about 12 million homes had Internet access in 1996 *but only about three million homes had actual usage by children and family members.* (There are about 19 million households with children.) Jupiter predicted a steep jump to usage by about 15 million homes by the year 2000—still a significant distance from the almost universal presence of the telephone in 1997. This slow rate of gain may change if cable modem availability gives homes access to the Web without requiring a $2000 computer system.

Emerging Ideas for Tomorrow

Now that we know that current technology can make the school program accessible to families, and that both teachers and parents will use technology for routine information exchange, what is next? Charp (1997) listed six current applications—three were phone based, two involved interactive television or video, and the sixth was home use of the Internet. In this section, we will sample some of the other emerging applications and speculate on an integrated model that could maximize the relationship between schools and homes.

What's New?

There are new applications of "off-the-shelf" technologies, newly developed delivery systems, and very interesting new programs designed to blur the

demarcation between school and home. This sampler is presented in no particular order of importance, and some specific examples are provided to illustrate the movement.

- *School software licensed for home use.* CUC Software now allows its popular educational software to migrate to homes so parents can "play a stronger role in their children's day-to-day education."
- *Teacher electronic planning and grade recording programs.* These programs are beginning to include files of home letters, records of parent contacts, and alternative progress reporting formats to enrich communication with parents.
- *School technology for parent use.* Schools are opening their doors to parents so school-based technology (especially Internet) can be used by family members. The AT&T Foundation funded a large project in Los Angeles County for 25 parent-accessible regional technology centers.
- *Selecting higher education.* Schools have used video, interactive videodiscs, and CD-ROM programs to help parents and students make college selections. Internet access from the guidance office (or from the home if the family has a computer) to the home pages of any university is becoming the norm as parents and students plan their next educational endeavors.
- *Internet linkages.* There are many initiatives to use the Internet (and e-mail) for school–home communications. Some groups (e.g., Family Education Network) offer any school in the country a free Web page and links to their other family resources. Conversely, virtually every parenting organization and publication also makes information available to families on the Web. IBM has been extending Internet exchanges between teachers and parents at the Governor's School in Charlotte, North Carolina, for more than two years as part of their "Reinventing Education" program. Although clearly a pervasive and powerful force for school–home communication (Trotter, 1997), the Internet demands a computer or other special device at the user end—a severe limitation for a universal connection.
- *Take-home technology.* By emulating Indiana's "Buddy Project" (Pick, 1996) where students and their families were given a computer for their home use, we can partially overcome the need for expensive equipment. For example, the exciting new Lightspan Partnership uses interactive video curriculum material in the classroom and sends a Sony Playstation CD-ROM unit home. Students and family members can collaborate on home-designed learning experiences using the CD-based programs on their own television set. Take-home laptops proved to be valuable for students in the "at-risk" category in Houston (Smith & Anderson, 1994), stimulating higher interest in education for students and their families.
- *Technology for home schooling.* Families who elect to educate their children at home use PCs and other technology to support their instruction. The Heller Report (1996) reported one survey where 67% of home schoolers had computers in their homes (a much higher rate than parents of school-age children in general). Instructional software and Internet access are typical uses, but there are also online courses to help parents learn to teach, online curricula, and even electronic magazines for the home-schooling community.
- *Video classroom observations.* First pioneered as a way for anxious parents to peek into their child's day care center, this Web-accessed video runs continuously. Parents can log on, look in, and feel reassured. The application can be used in any classroom (or even home care) situation and makes the learning experience visible to the parent from any computer with Internet capability. The "I See You" program broadcasts still pictures every 30 seconds; others go for 60-second shots, and ParentNet gives six frames per second over ISDN (Gorena, 1997). Full motion video cannot be far behind.
- *Opening the library.* Some schools are allowing parents with Internet computers to have electronic access to their library and other library resources in the school district. Community Internet Link, for example, uses a standard Web browser to help parents and students manage searches from home.
- *Electronic portfolios and report cards.* With the advent of portfolio assessment of student progress, it was inevitable that portfolios would move from folders to diskettes and video (Lankes, 1995). The Burris Laboratory School

in Muncie, Indiana, produces a "Video Report Card" using regular video cameras and tape (Greenwood, 1995). Others are using student portfolio software, which can incorporate voice, data, and video to show parents their student's performance in school.

These samples represent a lot of good ideas, often piloted on a very small scale, that have been slow to approach universal application or comprehensive information access. We believe the time is ripe for a fully integrated system of technology-supported school–home links that can permeate the walls that have divided these two institutions.

A Proposal for an Integrated Model

Imagine a parent returning home after a day at work and wanting to find out what their child did in school. The parent might touch the "on" button on the television remote control and hear:

> *"Good afternoon, Mr. Martin. We have two messages for you from school today. If you would like to hear them, touch or say one. If you would like to have them displayed on the screen, touch or say two. If you would like them placed in your e-mail file, touch or say three. If you would like a hard copy, touch four for fax delivery."*

After choosing the delivery mode, the parent listens to or reads the message. If the teacher's message specifies particular homework, the message may continue:

> *"In the earth science lesson, students are learning about the structure of the earth. We distributed a worksheet, and they are to label the layers. If your child does not have the worksheet, you may have it displayed on the screen, filed in your e-mail, or received on your fax machine."*

This communication method could provide two levels of family support that are currently unavailable—easy access to information about the school experience and a way to acquire the needed homework materials at home.

To carry the notion further, the menu could include a series of "help for parents" items. These could be content summaries (e.g., a refresher on the geology of the earth), home learning management ideas (e.g., "Why not divide the homework tonight into three smaller periods?"), and even parenting suggestions (e.g., how to set cooperative limits on television viewing). This category could include "parent primers" on everything from at-home study skills to reviews of this week's educational television offerings. Some of these items would be semi-permanent, and others could be pertinent to the current learning experience.

A next step would be to give parents access to the actual classroom experience. One choice in the menu would be to give either a "live" view into the classroom (during school hours) or a series of significant snapshots of what happened in the classroom today. For example, a teacher using cooperative learning strategies might provide a brief "quick time" video of a group of students pooling their knowledge to solve complex problems.

A new integrated technology model like this would also give parents direct access to student progress information, including grades, other evaluations, and online student performance portfolios. Each home could learn more about their child's teachers by accessing their personal/professional home page and (with time delay) could exchange messages by any of the available channels. It is conceivable that parents could leave a full-motion video message from home or elect to use simple voice or e-mail.

In direct support of student learning, the new model would give students everything from access to online searches (e.g., "Ask Dr. Math" or "KidsConnect") of area educational resources to multiple-channel ways to interact with teachers, counselors, and content experts. Students would also be networked with each other, so "studying together" could take on a whole different meaning.

Advantages and Limitations of the Integrated Model

If we decided to close the gap and knock down the walls that prevent parents and teachers from forging effective partnerships in support of the child's education, the means are at hand. From the home side of the equation, all of the devices and services mentioned above are readily available (although currently too expensive for every home). This idea takes into consideration the needs of the family and the student to maximize the home learning environment and responds to some of the complexity and circumstances of today's diverse families.

On the technology side, the model will probably depend on how rapidly the "set-top box" and other cable delivery systems expand (Mannes, 1995) or another broadband connection emerges. The

integration of video conferencing to current capability would enrich the exchange. In the foreseeable future, an integrated cable delivery is the most likely pipe to use for this interchange.

In this case, the home could be ready to connect faster than the schools are to send. This integrated model implies that every classroom would have video conference capability, multiple access channels, and network hookup within the school and to the community. It will depend on small increases in teacher energies to package and send information home and a philosophical commitment that opening the classroom to the home is an important and valuable endeavor.

Synthesis

Voice-messaging technology using the telephone can open any school in America to the homes of the students. These models are dependable, easy to use, and cheap. With a few jumps in integrated cable technology and the integration of functions, the home could have a greatly enriched exchange of information with schools. With vision, collaboration, and cooperation, every student's home and school could form new synergies on the way to true learning communities.

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The Family–School Connection and Technology

Jay Blanchard ■

Abstract

As an integral part of American life, technology is expected to accomplish a variety of tasks, including promoting the educational development of children. To accomplish this task, technology must deal with the challenge of connecting the two major institutions of learning for children: families and schools. Surveys indicate that while most Americans believe a strong family–school connection is important, they do not act to support that belief. Contemporary models of the family–school connection focus on a number of different factors and cover a multitude of investigative perspectives. Causal models focus on factors that directly or indirectly influence educational and social outcomes, while practices models refer to how families and schools work together to support student outcomes. Technology in both models has indirect effects on student outcomes. A number of projects studied the influence of technology, including Project TELL, ThinkLink, Lightspan Partnership, and the Indiana Buddy System. Analysis of these projects indicates that technology can serve the family–school connection in four areas: (1) communication and information, (2) learning and instruction, (3) interest and motivation, and (4) resources and costs.

■

Introduction

Technology is one of the most fascinating and modern aspects of life today. Its relentless innovative spirit has placed it almost everywhere. Regardless of the home, school, or community where it is used, technology seems to have the same vitality and forceful attention-gathering effects. People enjoy it. They respond to it. They expect it. For them, technology seems to have few limitations and almost magical strength.

Today, most children of school age, their parents, and their teachers have spent a large portion of their lives using technology—whether it is looking at screens, listening to music, or talking on telephones. Technology has come to dominate American life and is an integral part of American life. As a result, modern technology is seen by many as a new Prometheus: the creator of a modernistic order. But this inclination to ascribe mythical powers to technology presents technology with monumental tasks that it is expected to accomplish under a variety of dazzlingly difficult and almost impossible conditions. One of these tasks is nurturing the moral, social, and educational development of American children. To accomplish this task, technology must deal with the challenge of connecting the two major institutions of learning for children: families and schools. Nothing could be more difficult.

Connecting Families and Schools

Connecting families and schools means that characteristics, beliefs, and practices of everyone from these institutions affect the moral, social, and educational development of children. Simply put, the family–school connection means that homes and schools are connected and linked in service of students—and these connections and links have important affects for children (Booth & Dunn, 1996; Swap, 1993; Bronfenbrenner, 1979, 1986; Epstein, 1996; Featherstone, 1976; Lareau, 1989; Lightfoot, 1978; Ryan & Adams, 1995; Scott-Jones, 1995; Steinburg, 1996; Hoover-Dempsey & Sandler, 1995; U.S. Department of Education, 1994).

While this explanation seems simple and perfectly understandable, it is, unfortunately, troublesome. Why? First, understanding the family–school connection is a formidable challenge because parked inside the connection is a network of remarkably

complex relationships between two complex institutions. The power of these relationships and institutions is that they can work together in different ways to help children. Second, the term itself, the family–school connection, covers a multitude of perspectives and stakeholders. For example, historically the study of families and schools has been dominated by educators and sociologists. Educators have tended to focus on what the schools can do for the family, and sociologists have tended to focus on what the family can do for the schools. These perspectives have tended to balkanize investigative perspectives and stakeholders into camps that the reader must keep in mind when examining investigations of the family–school connection. As a result, there are a wide variety of issues that can be considered the family–school connection despite their having little to do with the influences of families and schools on children (see also Bierman, 1996). Keeping this fact in mind, the discussion will next turn to the importance of the connection, including models, a review of technology studies, and what current technology might do to help the family–school connection.

The Importance

The family–school connection, a field of study that did not exist before the 1960s, can claim two founders: (1) the Elementary and Secondary Education Act of 1965 (ESEA), which specified that parents were expected to assume a more direct role in their children's formal education; and (2) the Civil Rights Act of 1964, Section 402, and the resulting research by James S. Coleman on the importance of family in the education of disadvantaged children (Coleman et al., 1966). Since that time, researchers have struggled to map the family–school connection and understand how all the relationships fit together. Much has been learned about the effects of schools on student outcomes and the effects of families on student outcomes, but not much is known about the relationships between the two.

Despite this difficulty, the assumption is that positive family–school connections help ameliorate a lot of negative factors that affect student outcomes. The American public seems to agree with this assumption. The 29th Annual Phi Delta Kappa/Gallup Poll (Rose, Gallup, & Elam, 1997) found that 86% of the public believe that parental support is the most important factor in determining a school's success. A review of data from the largest survey undertaken in American history related to the family–school connection, namely, the National Education Longitudinal Study of 1988 (NELS:88), clearly points to one factor that promoted educational success—the degree to which parents are actively involved in their children's education.[1]

It has not gone unnoticed by politicians, government agencies, universities, and foundations that Americans support the concept of parents being actively involved in their children's education (Wall Street Journal/NBC News Poll, 1997). The Educate America Act of 1994: Goals 2000 set out eight goals and established mechanisms to reach them. The eighth goal is: By the year 2000, every school will promote partnerships that will increase parental involvement and participation in promoting the social, emotional, and academic growth of children. Also in 1994, the U.S. Department of Education's publication entitled *Strong Families, Strong Schools* documented the research base supporting the importance of the family–school connection in student outcomes. "Three decades of research have shown that parental participation improves students' learning. This is true whether the child is in preschool or the upper grades, whether the family is rich or poor, or whether the parents finished high school" (p. 2).

The U.S Department of Education was not alone in investigating the role of families and the family–school connection in student outcomes. The National Committee for Citizens in Education also sponsored a comprehensive review of available research. Their review, entitled *The Family Is Critical to Student Achievement* (Henderson & Berla, 1994), concluded that:

> When schools work together with families to support learning, children tend to succeed not just in school, but throughout life. Children profit because of: (a) higher grades and test scores, (b) better attendance and more homework done, (c) fewer placements in special education, (d) more positive attitudes and behavior, (e) higher graduation rates, (f) greater enrollment in post secondary education. Parents profit because of: (a) more confidence in the schools, (b) teachers have higher opinions of parents, (c) teachers have higher expectations for students, (d) more confidence about helping their children and about themselves as parents. Teachers and schools profit because of: (a)

> Improved teacher morale, (b) higher ratings of teachers by parents, (c) more support from families, (d) higher student achievement, (e) better reputations in the community. (p. 1)

A very recent example provides testimony to the continued importance of the family–school connection in the minds of Americans. The New York State reading and mathematics school-by-school evaluation reports revealed that three schools (i.e., P.S. 29 and 88, Bronx; P.S. 31, Brooklyn), with high poverty and limited English proficiency (LEP) levels among students, outperformed other schools with similar backgrounds and many schools where poverty and LEP levels were not a concern. These schools had four common characteristics: "a clear sense of mission, a consistent curriculum, strong parent involvement, and a willingness to solve their own problems" (Hernandez, 1997, p. A10). While the family–school connection was only one of the ingredients affecting student outcomes at these schools, nevertheless it was a necessary part of the successful mixture.

In summary, what all this information points to is the commonsense notion that Americans are interested in a strong family–school connection, meaning that when both parents and teachers are involved in children's education at home and at school, everyone profits. Yet, there is a paradox. While most Americans support the idea of a family–school connection (Lou Harris and Associates, 1993), in reality too many parents do not practice the idea (see Hoover-Dempsey & Sandler, 1995, for a rationale). For instance, NELS:88 found that only 53% of parents contacted school about their child's academic performance during the year, and only 32% reported they belonged to a parent–teacher group with about 10% of those claiming to have attended meetings (Kerbow & Bernhardt, 1993).[2] The NELS:88 results appear to be confirmed in the recent *Survey on Family and School Partnerships, K–8* (also titled *Parents and Schools: Partners in Student Learning,* U.S. Department of Education, 1996). The survey found that only about 49% of all the 810 elementary schools polled reported that most or all of parents attend open house or back-to-school night, only about 57% attend parent–teacher conferences, 36% attend arts events, and 19% attend science fairs or academic demonstrations. When the survey data are examined for schools from minority and poor neighborhood schools, only about 30% report that most or all parents attend open house, 37% attend parent–teacher conferences, 17% arts events, 5% sports events, and 3% academic demonstrations.

Models

Contemporary models of the family–school connection focus on a number of different factors, and as noted earlier, the models cover a multitude of investigative perspectives and stakeholders—all of which can fit under the umbrella term of the family–school connection (Ryan & Adams, 1995; see Epstein, 1992; Swap, 1993, for discussions of historical models). Most models of the family–school connection can be forced into two categories: (1) causal models and (2) practices models. Causal models focus on factors that directly or indirectly influence or cause educational and social outcomes (Epstein, 1990; Eccles & Harold, 1996; Ryan & Adams, 1995). Practices models, as the term implies, refer to how families and schools can work together to support student outcomes (Epstein, 1992; Lombana, 1983; Swap, 1993).

Causal Models

One of the most cogent causal models of the family–school connection is offered by Joyce Epstein, an authority in the field and former director of the National Center on Families, Communities, Schools and Children's Learning. The Epstein (1990) model "views the shared responsibilities of families and schools as a set of overlapping spheres of influence that alter the interactions of parents, teachers and students, and other members of the two institutions and affect student learning and development" (p. 100). The model includes three major forces that influence student outcomes: (1) time—to account for changes in the ages and grade levels of students and the influence of the historic period; (2) the philosophies, policies, and practices of the family; and (3) the philosophies, policies, and practices of the school.

Another influential causal model by Eccles and Harold (1996) focuses on factors in the child's environment (i.e., parent/family, neighborhood, teacher, school) as well as teacher and parent beliefs and practices that affect student outcomes. According to Eccles and Harold (1996), the effectiveness of this model has been successfully tested in the Michigan Childhood and Beyond Study (MCABS) and the Maryland Adolescent Growth in Context Study (MAGICS).

The Ryan and Adams (1995) causal model focuses on within-the-family factors that affect student outcomes. "The model is not intended to account for all the ways family members or other social agents, such as peers or teachers, could influence children's outcomes" (p. 7). The model includes the following factors: (a) abilities within the child, (b) parent and child interactions with respect to school and nonschool issues, (d) interactions beyond just the parent and child, (e) interaction processes that characterize the family, (f) parents' beliefs and actions, and (g) social/cultural and biological characteristics.

Practices Models

Practices models are just that—models about practices that help families and schools work together. Epstein's (1996) model or framework contains six categories of practices that will help schools "work with families and communities to assist them to become or stay informed and involved in children's education at home and at school" (p. 215). The six categories are: (1) parenting, (2) communicating, (3) volunteering, (4) learning at home, (5) decision making, and (6) collaborating with community. By way of a brief overview, parenting refers to helping families establish home environments to support children as learners. Communicating means effective forms of school-to-home and home-to-school communications about school programs and children's progress. Volunteering is about recruiting and organizing parent help and support. Learning at home provides information and ideas to families about how to help students at home with homework and other curriculum-related activities, decisions, and planning. Decision making is about including parents in school decisions and developing parent leaders and representatives. And, finally, collaborating with the community means identifying and integrating resources and services from the community into school programs, family practices, and student learning and development.

Swap (1993) offers a practices model that features four elements: (1) creating two-way communication, (2) enhancing learning at home and at school, (3) providing mutual support, and (4) making joint decisions. Swap suggests this model for schools where "most children are not doing well in school, the population of children and families is heterogeneous, and there is a lack of agreement among families and educators about the definition of success in school and the characteristics of children and schools that contribute to success" (p. 48).

The Scott-Jones (1995) practices model is a within-the-family model. It focuses solely on family practices that affect student outcomes. The model offers four categories of practices: (1) valuing, (2) monitoring, (3) helping, and (4) doing. In the model, valuing refers to the direct and indirect communication of the value of education by parents or the family. Monitoring refers to parents or the family monitoring school performance and activities that can enhance or diminish achievement. Helping refers to parents or the family acting as teachers and tutors in a wide variety of learning situations. Probably the most common example is a parent or other family member reading with a child. Doing refers to parents and family members actually doing school activities for children.

A Final Note on Models

All causal and practices models of the family–school connection discuss direct and indirect effects on student outcomes. But technology as a variable in both models can only have indirect effects on student outcomes because technology is a tool that depends entirely upon the nature of the content it is associated with. But that does not mean that indirect effects are powerless in affecting student outcomes. Quite the contrary. What it means is that the match between the content and student outcomes will determine the power of the indirect effects. Consider two examples: *Sesame Street* and *Reading Rainbow*. If the producers of the TV program *Sesame Street* focus on a particular reading skill known to be included in reading achievement measures (e.g., graphemic bases or word families), then the program content and the associated technology will have more immediate and powerful indirect effects. In essence, the more proximal the program content of *Sesame Street* is to achievement measures, the more chance it, and its associated technology, will affect student outcomes associated with those measures.

In the case of a TV program like *Reading Rainbow*, the program content is likely to be distal to achievement measures—and planned that way. Obviously, technology associated with content that is distal to achievement measures is less likely to have an impact on student outcomes involving those measures (see Ryan & Adams, 1995, for a discussion). Of course, the tricky part is deciding

what are the desired student outcomes and how to measure them.

The Family–School Connection and Technology

For all children in America, the family–school connection does not take place in the absence of technology. U.S. Census and Department of Education data (U.S. Department of Education, 1995, 1997a) indicate that most American families and schools have access to telephones and TVs—two of the four major ingredients of the information superhighway along with computers and access to networks such as the Internet. Schools have access to even more technology than homes. In the *Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996* survey, 74% of schools reported "using" advanced telecommunications to access information, 67% reported use for record keeping within the school or district, 22% reported use for parent communication, and 22% reported use for distance learning (U.S. Department of Education, 1997a).[3] The data reported for teachers were somewhat different. According to the survey, 20% of schools surveyed reported that teachers regularly used advanced telecommunications for teaching, 16% for staff development, and 15% for curriculum development.

Several explanations about these data are important to gain a sense of their meaning. First, it was a randomly stratified sample of 911 schools. Second, the term *advanced telecommunications* refers to broadcast TV, cable TV, Internet, local and wide area networks, as well as one-way or two-way audio, video, or computer links—not standard telephone or fax. Finally, the survey questionnaire was sent to school principals who were directed "to forward the questionnaire to the computer or technology coordinator or to whomever was most knowledgeable about the availability and use of advanced telecommunications at the school" (p. 12). It is unknown who completed the questionnaire at each school and the degree to which it was "politically correct" to indicate the use or nonuse of technology.

Family–School Connection and Technology Research

Evaluating the effectiveness or impact of technology in the family–school connection can be troublesome. As noted in the U.S. Department of Education (1997b) report entitled *The Effectiveness of Using Technology in K–12 Education: A Preliminary Framework and Review*, evaluating technology in K–12 education is not an exact science. The report identifies five challenges.

- Distinguishing hype, assertions, hopes, and expectations from rigorous research results.
- Evaluating a moving target (technology is changing rapidly).
- Evaluating the potential impact of the use of technology when there are few, if any, settings in which it is being used optimally.
- Generalizing from one type of technology to another, from one subject matter to another, from one type of student to another.
- Determining the appropriate outcomes to measure. (p. 4)

Not surprisingly given these and other challenges, only a few projects are available for analysis about the family–school connection and advanced technology (e.g., *Project TELL*, Birenbaum, Hochwald, & Kornblum, 1994; *ThinkLink*, Cline, Omanson, & Sisung, 1994; *Lightspan Partnership*, Godin, 1996; *The Buddy System Project*, Rockman & Mayer, 1994). While these studies use different technologies and methods, nevertheless they share a common interest in the family–school connection and technology.[4]

Project TELL

Project TELL began in 1990 and ended in 1993. It had three major initiatives: Computers in the homes, computers in the classrooms, and voice messaging. It was sponsored by NYNEX and the Board of Education of the City of New York. A total of six schools participated in the project, with five schools involved in one or two initiatives and one school participating in all three (Manhattan, P.S. 75).

In the Computers in the Homes initiative, computers (with modems and printers) were placed in the homes of 124 at-risk sixth-grade students in five schools. Students were given accounts to an electronic bulletin board, they were provided with weekly 2-hour user-group meetings staffed by teachers, and they were encouraged to use their bulletin board and e-mail by their teachers.

In the Computers in the Classrooms initiative, teachers working with approximately 500 at-risk students at three schools were given the technology and staff development necessary to use technology

in their classrooms. In addition, teachers were provided their own TELL technology for home use.

In the Voice Messaging initiative, classrooms and homes from P.S. 75 were connected so that administrators, teachers, students, and family members could communicate through voice messaging.

Combining the results from these initiatives, project evaluators offered the following conclusions (Birenbaum, Hochwald, & Kornblum, 1994). First, the innovative uses of the technologies in the projects were welcomed by the students and had a powerful influence upon their self-esteem and learning capacity. For example, time children spent on the bulletin boards increased the time they spent reading, writing, and learning cognitive and technical skills. Second, children involved were three times less likely than other children to move to another school. Typically, families in the neighborhoods that participated in the study changed homes and schools quite frequently. Third, a computer in the home proved to be an unexpected and welcome learning resource for family members. Fourth, Project TELL equipment was respected; during the three years that computers were in the homes, damage, theft, or loss of the equipment was nil. Fifth, teacher/staff development remained a major issue. Finally, voice messaging in the project proved to be an unqualified success.

ThinkLink

ThinkLink was a video-on-demand or prescheduled video project for selected fifth-graders, their families, and their teachers in Sterling Heights, Michigan. Ameritech (Michigan Bell) sponsored the project during 1993 and 1994. About 150 fifth-graders participated at two elementary schools (Thorpe, Jefferson Elementary). All homes and classrooms were connected by a custom-built fiber optic network to a central media server at one of the schools.

Cline, Omanson, and Sisung (1994) completed an evaluation of ThinkLink and concluded that ThinkLink affected students' home-viewing habits either by adding to their daily viewing time or by cutting into viewing time for noneducational programs, positively affected Michigan Educational Assessment Program Science Test scores, and positively affected motivation for schooling. For parents and teachers, ThinkLink positively affected their attitudes about the use of technology for learning.[5]

Lightspan Partnership

The Lightspan Partnership project featured state-of-the-art multimedia, PC/CD-based instruction with a K–6, reading, language arts, and mathematics curriculum. Godin (1996) completed a survey evaluation of the Lightspan Partnership project during the spring of 1996 in 81 elementary school classrooms nationwide that volunteered to participate. The evaluation surveyed 81 teachers in grades K–6 along with 445 families of children in their classrooms. Students, teachers, and parents used the Lightspan Partnership instructional activities both at home and at school throughout the spring of 1996.

Family survey data indicated that (a) 69% of children used the instructional activities an hour or more each day, (b) 72% of the parents claimed to have spent at least one-half hour or more with their children using them, (c) 52% of parents indicated that they spent the same amount of time daily using the activities on their own, (d) 60% of the parents indicated that talk at home between parent and child about schoolwork increased because of the project, and (e) 70% of parents indicated that their knowledge of what their child was doing in school increased. More anecdotal family survey data found that a majority of parents believed their children's interest and motivation toward school increased, and parents believed these increases resulted from fun and novelty effects of the activities.

Teacher survey data found that (a) 91% of teachers had some students working each day or every other day with the project, (b) 32% of teachers used the activities with students each day, (c) 75% of the teachers reported that they used the project with pairs of students or individually, and (d) 75% of teachers reported increased interest and motivation towards schoolwork as a result of the project.

The Indiana Buddy System Project

Buddy is a partnership of Indiana school districts, the state of Indiana, foundations, businesses, and the Corporation for Educational Technology (CET) that supports the use of technology in homes and schools for instruction and telecommunications. Buddy supports technology use by working with school districts to equip families and classrooms with computers, printers, and modems. School districts make decisions about how to use

technology. Buddy also provides staff development for teachers, technology training for parents, software catalogs, discounts on software purchases, newsletters, as well as a statewide network (BuddyNet). The project began in 1988 with 500 families and a few classrooms. Today, over 7,000 fourth-, fifth-, and sixth-graders at sites throughout Indiana participate along with their parents and teachers.

The most recent evaluation of Buddy available (Rockman & Mayer, 1994) found that students made improvements in writing, computer technology, critical thinking, problem solving, and collaborative activities with peers. Teachers reported changes in their instruction, especially with regard to the integration of technology in their classroom activities and improvement in communication with parents. Families reported strengthened family–school connections and an increased ability to assist in their children's education.

How Can Technology Help

For most homes and schools, the technologies of the information superhighway should help the family–school connection in the near future. In some cases, it is already happening. For example, since 1995, the U.S. Department of Education has funded 43 Challenge Grants for Technology in Education and continues to fund new grants. These grants include family–school connection emphases and should provide much-needed information on how technology can (and cannot) connect families and schools (Bodilly & Mitchell, 1997).

There would seem to be at least four ways that technology can serve the family–school connection: (1) communication and information, (2) learning and instruction, (3) interest and motivation, as well as (4) resources and costs.

Communication and Information

- Technology can help establish two-way communication between homes and schools. For instance, parents can learn about the daily academic responsibilities of their children and what teachers do everyday. Teachers can learn about the daily responsibilities of families at home and work.
- Technology can help discussions of school experiences within and among families and the community. One hopes these discussions will strengthen family and communities and improve their attitudes toward schools. These discussions are important for low-income families that tend not to develop social networks beyond the family.
- Technology can help schools involve families who are presently difficult to reach, and technology can help families involve schools that are difficult to reach. Some teachers may feel that family–school connection responsibilities are a burden and that parents will not be particularly responsive if they try to reach them. Some parents may feel the same way.
- Technology can help make communication easier. Many teachers do not live in the community where they teach, and many parents do not work in the community where their children go to school. Distance to school and work can be important factors that inhibit communication. Convincing everyone in the family–school connection to work together means they must all communicate. While technology cannot make anyone communicate, it can encourage them and make it easier if they do decide to try.
- Technology can help inform homes of school governance issues including shared decision making and advisory functions. This communication should help reduce fragmentation of programs, education, and social services. Technology can help schools and communities develop strategies and programmatic structures that enable parents to participate in the schools and teachers to participate in the communities.

Learning and Instruction

- Technology can help teachers and families acquire needed knowledge and skills. For instance, technology can help teachers augment their instructional skills and families augment their parenting skills.
- Technology can help build the capacity of schools to improve the educational health of the family and extend learning opportunities from the school to the home and family. For example, technology can help enhance the effectiveness of homework. Currently when homework is less than effective as learning experiences (i.e., students do not understand it or will not do it; parents will not supervise it; teachers do not explain it), the teachers blame

the students, the students blame the teachers, the parents blame everyone, and the school administrators run for cover.

- Technology can help parents act as instructors or coaches as well as learning partners. It can help augment parenting skills.
- Technology can support classroom teaching as well as review and reinforcement activities. Technology can help increase learning opportunities for individualized instruction, student-directed learning, teacher-directed learning, and peer-directed learning.
- Technology can provide "professional help" at home and school for everyone concerned with the family–school connection.
- Technology can help schools develop learning activities at home that provide meaningful roles for children and parents. Leisure-time activities of children from low-income families tend to be less informal and less related to learning than leisure-time activities of their middle- and upper-income peers. Technology can provide meaningful (and affordable) home-based learning activities.
- Technology can help explain and illustrate concepts that are difficult for teachers to teach, students to learn, and parents to understand. The use of simulations or slow-motion video are two examples. Practically, few schools and families would have the resources to duplicate most computer-based multimedia activities.
- Technology can help schools and families with educational alternatives and choices that expand and stretch their opportunities for learning. Also, given ever-limiting school and family budgets, technology can provide instructional resources (materials and methods) that are normally unavailable and perhaps emphasize prevention and education as opposed to treatment.
- Technology can help teachers and students organize and structure complex tasks while providing access to real-life phenomena. For example, simulations can provide learning situations that involve complex, dangerous, or previously unavailable phenomena.
- Technology can help schools and families use resource-rich informational environments like the Internet. These communication tools can promote both global and local collaboration.

Interest and Motivation

- Technology can help families and schools motivate children.
- Technology can provide ways for schools to connect with homes, and homes can use technology to connect with schools. For example, school factors are a primary influence on parent involvement—so make technology part of the practices that are used to encourage parent involvement. Technology may not only give teachers a chance to talk with each other but also families to talk with other families on a level not possible with the telephone. The bonus would be a collection of families and teachers across a school district, widely varied but united in support of student achievement.
- Technology can provide support and coordination for homes and schools to sustain involvement.

Resources and Costs

- Technology can help reduce the financial, emotional, time, and resource costs of educating children, easing burdens for homes and schools.
- Technology can help address issues of equality of resources and learning opportunities. Clearly schools draw unevenly on the resources of the home, and conversely the home draws unevenly upon the resources of the school. Technology can help to even out this imbalance.

In Conclusion

The family–school connection and technology is about using technology as a tool to develop and enhance the reciprocal influence of schools and homes on student outcomes. It means that homes and schools are connected and linked through technology—and these connections have important effects for everyone.

Technology presents an almost endless supply of fascinating opportunities for all stakeholders in student outcomes—including students—to help the family–school connection. But finding ways to connect and link all stakeholders in the family–school connection presents a set of stubborn and bedraggling problems that, so far, we have not been able to solve without technology. Add to these

problems the rapidly changing social, economic, educational, and political landscapes in which the family–school connection takes place—and technology has its hands full. Against this background, technology must be careful not to create its own myths (Cuban, 1986; Stoll, 1995).

While technology may seem like a single, unified, and almost mythic answer to the problems of the family–school connection and American education, of course it is not. Technology is only a tool—but a very powerful tool with a variety of solutions to a variety of problems. That is its strength.

Endnotes

[1]The NELS:88 survey was a national random sample of about 25,000 eighth-graders, parents, teachers, and school administrators in 1,000 public and private schools. The follow-up studies of 1990 and 1992 looked at a subsample of the original participants when the students were in tenth and twelfth grades, respectively. "NELS:88 was designed to examine student achievement over time and to focus on family, community, school, and classroom factors that may promote or inhibit educational success" (Schneider, 1993, p. 8). The NELS:88 data are especially important given the size and scope of the survey.

[2]It is important to note that the NELS:88 survey did provide some key information about factors that determine whether or not parents participate in the family–school connection; namely, their orientation toward education, their financial needs and resources, and their opportunities to participate (Schneider, 1993; see also Hoover-Dempsey & Sandler, 1995, for a discussion of why parents choose to become involved). Also, analysis of data is beginning (September 1997) from the National Longitudinal Study of Adolescent Health (a survey of 90,000 children and adolescents from 12–18). Initial analyses indicate that teenagers with close ties to family members exhibit fewer at-risk behaviors.

[3]The survey percentages for schools using advanced telecommunications in all categories did not change markedly from school to school due to school characteristics (instructional level, size of enrollment, metropolitan status, geographic region, minority enrollment, and free lunch eligible). In addition, uses of advanced telecommunications by category (access to information, record keeping, communication, and distance learning) due to school characteristics did not change much either. These results were also true for how teachers used advanced telecommunications (teaching, professional development, curriculum development) by school characteristics.

[4]An exception might be the use of telephone communication (i.e., voice messaging, attendance, schedules; see Bittle, 1975; Chapman & Heward, 1982), which has been used widely in the family–school connection. However, the U.S. Department of Education advanced telecommunications survey did not consider the "standard" use of the telephone or fax as advanced telecommunications.

[5]Strictly speaking, ThinkLink is a media server-based family–school connection study. Also, at about the same time as ThinkLink, in Birmingham, Michigan, the teacher, students, and families of two fourth-grade classrooms experimented with a video-on-demand connection (stills and audio) through a local cable provider, Booth Communications, and the IT Network of Dallas, Texas. (See Bray, 1993.)

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Connecting Families through Innovative Technology in an Early Childhood Gifted Program

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Abstract

University Primary School (UPS) is an early childhood gifted program affiliated with the University of Illinois at Urbana-Champaign. This paper highlights three innovative uses of technology at UPS: Knowledge Web pages, photo portfolios, and Chickscope. The Knowledge Web pages are a collection of Web pages that serve as a virtual bulletin board for the students' project work. This virtual bulletin board extends the classroom to the home where parents can view their child's work. Photography, including the use of a digital camera, has enhanced the ability of the teachers to document the learning that occurs in a project-based curriculum. Photo portfolios document areas of growth that are not easily captured by traditional measures of assessment. Chickscope enabled students in a K/1 classroom to control an MRI scanner at the National Center for Supercomputing Applications (NCSA) to study developing chicken embryos. This paper also describes ways in which children integrate the Internet into many aspects of their ongoing work. These examples of how UPS uses the latest in technology provide a starting point for many educators who are planning to integrate technology into their curriculum, program goals, and everyday activities.

■

Introduction

The old adage that a "picture is worth a thousand words" is certainly true when it comes to capturing moments in a child's life. At University Primary School, we have been working diligently to "capture" and communicate the life and learning that occurs in our early childhood classrooms through innovative uses of technology. This paper highlights specifically three innovations in which we use the Internet and photography to connect our families to our school activities: "Knowledge Web pages," "photo portfolios," and "Chickscope."

University Primary School

University Primary School (UPS) is an early childhood gifted program affiliated with the Department of Special Education at the University of Illinois at Urbana-Champaign. There are three classrooms of approximately 25 students: one classroom of 3- and 4-year-olds, and two classrooms of kindergarten/first-graders. Each K/1 classroom is staffed with a head teacher and an assistant. The preschool classroom has two assistant teachers. Children are screened for the program using a portfolio approach. Portfolios include parent questionnaires, the results of student performance on the Kaufman Assessment Battery for Children (K-ABC) (Kaufman, 1983), an open-ended drawing activity, and samples of children's drawings, dictations, and writings in the portfolios.

UPS Curriculum

One predominant feature of the school is the project-based curriculum and "Activity Time" built into the day for students to pursue choices. Projects present learning to children in real-life contexts and integrate the acquisition and application of basic skills through inquiry modes of learning. Although much of the children's time is spent pursuing project investigations, small-group instruction at the K/1 level also includes special time periods for language and literacy and numeration and problem solving. The program emphasizes a whole language approach to literacy where children learn to read by reading and to write by writing. Math instruction focuses on relating math to real-life

situations using manipulatives and other concrete materials. Math and reading are also integrated throughout the pursuit of project investigations.

Computers

Computers are used at UPS as tools to enhance the students' learning. Children use the computers much as they are used in the adult world—to assist students in writing documents, to communicate with families (e-mail), and to locate resources for their investigations. The teachers use the computers for many of the same reasons. In our quest to document and communicate what the children are learning, we have expanded our use of computers to develop a home page and, with much parent support and creativity, design the Knowledge Web pages.

All of the UPS computers are Macintosh—we currently have four SE/30 Macintosh computers in the preschool classroom, ten SE/30 computers in one K/1 classroom, and seven in the other K/1 classroom. A Performa was purchased for each K/1 classroom with program funds and parent donations. Most all of the other computers are on "permanent loan" from other departments on the campus who have discarded them to upgrade their own systems. One parent took the initiative to be our computer and technology coordinator 2 years ago, and even though he no longer has a child in the program, has continued to serve as our technology coordinator and Webmaster. Each year, he trains other parents to maintain our computers. Without this sustained support and expertise of parent volunteers, UPS could not model innovative uses for technology.

Knowledge Web Pages

History and Rationale

The sections that follow discuss the use of the Internet and World Wide Web as an extension of the classroom bulletin boards. A series of Web pages called "Knowledge Web" pages were designed to increase communication among parents, teachers, and children. These "Knowledge Web" pages foster communication among parents, teachers, and students by displaying students' project work linked to the school's curriculum.

The "Knowledge Web" pages are an extension of the school's home page. The primary purpose of the school's home page is to provide parents with school contact information and community and Internet resources for gifted education. In addition to the parent resources, the home page also displays examples of classroom activities with digital photographs and scanned artwork. The school's home page was created and is maintained by the parent of a former student, who does not have regular contact with the teachers. As a result, some of the activities displayed on the home page are older. Parents of new students viewing the home page requested more student material on the Web pages, to improve their understanding of their child's school activities.

In addition to the request for more up-to-date student material on the Internet, parents were concerned with how the project work in the classroom related to the school's curriculum. They wanted to see how classroom projects addressed the school's curriculum topics of Social and Emotional Growth, Art and Aesthetics, Language Arts, Numeration and Problem Solving, and Activity Time. Rody (M. Rody, personal communication, February 25, 1996) created "curriculum webs" that identified the classroom learning domains addressed in project work on the classroom wall as the project was completed. The Knowledge Web pages extend Rody's curriculum web to identifying the curriculum areas addressed in specific classroom projects. Instead of using a classroom bulletin board, however, the Knowledge Web is displayed on the Internet, creating a "virtual bulletin board." With equipment such as a digital camera and scanners, media from the classroom can be displayed within a day of creation. Thus, the "Knowledge Web" pages are dynamic, and updates occurred at least once a week between January and May 1997. These Web pages provided the same advantage of viewing a classroom bulletin board in the convenience of parents' homes or offices.

Knowledge Web Components

The Knowledge Web pages are sets of project Web pages linked to the school's home page. A list of the hardware and software needed to create these Web pages can be found in the Appendix. There is one set per classroom project, and at this point, there are three K/1 projects (turtles, corn, and snack) and two preschool projects (puppet show and otters). The first page in the Knowledge Web is called the *Main Page*. The *Main Page* provides links to each represented project and an e-mail link for comments. Providing a "Mail Link" for feedback is essential for increasing communication between

parents, or other adult users, and the teaching staff. The *Main Page* also contains a copyright notation to safeguard unauthorized use and the date the pages were last updated to encourage return visits.

Each project in the K/1 classroom is depicted in a "frames" format, which appears on the Web browser as three simultaneously viewed pages. Figure 1 shows the "frames" format for the corn project.

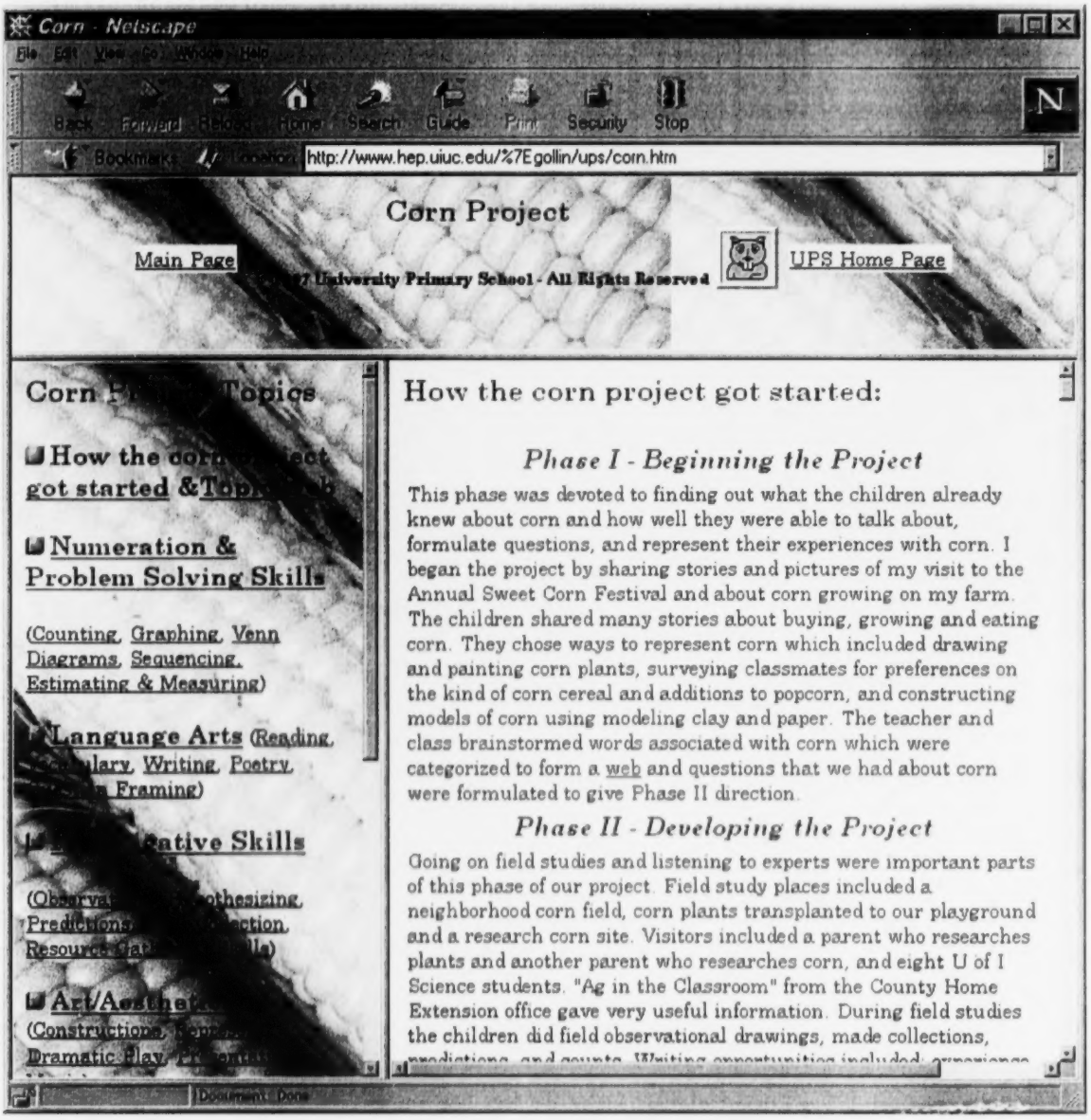
Corn - Netscape
Back
Forward
Reload
Home
Search
Guide
Print
Security
Stop
Bookmarks
http://www.hep.uiuc.edu/%7Egollin/ups/corn.htm
Corn Project
Main Page
University Primary School - All Rights Reserved
UPS Home Page
Topics
How the corn project got started &
Numeration & Problem Solving Skills
(Counting, Graphing, Venn Diagrams, Sequencing, Estimating & Measuring)
Language Arts (Reading, Writing, Poetry, Framing)
Art/Aesthetic
(Constructions,
Dramatic Play,
How the corn project got started:
Phase I - Beginning the Project
This phase was devoted to finding out what the children already knew about corn and how well they were able to talk about, formulate questions, and represent their experiences with corn. I began the project by sharing stories and pictures of my visit to the Annual Sweet Corn Festival and about corn growing on my farm. The children shared many stories about buying, growing and eating corn. They chose ways to represent corn which included drawing and painting corn plants, surveying classmates for preferences on the kind of corn cereal and additions to popcorn, and constructing models of corn using modeling clay and paper. The teacher and class brainstormed words associated with corn which were categorized to form a web and questions that we had about corn were formulated to give Phase II direction.
Phase II - Developing the Project
Going on field studies and listening to experts were important parts of this phase of our project. Field study places included a neighborhood corn field, corn plants transplanted to our playground and a research corn site. Visitors included a parent who researches plants and another parent who researches corn, and eight U of I Science students. "Ag in the Classroom" from the County Home Extension office gave very useful information. During field studies the children did field observational drawings, made collections,

Figure 1. "Frames" format used on the Knowledge Web pages.

The first page at the top third of the screen, or *banner* page, contains the project title and links to the school's home page and the Knowledge Web main page. These links facilitate usage for adults and children by providing the user a quick way to go back and view another project or go to the

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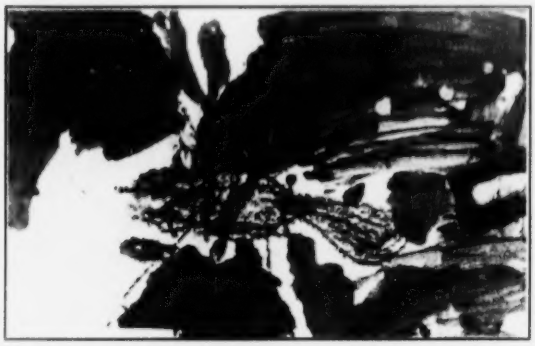
resources on the school's home page. The bottom two-thirds of the screen is divided into two sections and displays two pages: the *table of contents* and *materials* pages. The *table of contents* appears on the left half of the screen and lists the curriculum topics with links to project work in the *materials* page on the right half of the screen. The links are made with "bookmarks," which are highlighted keywords or icons that, when "pressed" by the user, change the material viewed in the browser. Thus, to view a series of examples on Art and Aesthetics, all a user has to do is press its icon in the *table of contents* page and examples appear in the *materials* page. Occasionally, some project-work examples are too large and are best viewed on a whole page. In those instances, a link to a full-screen view for those examples is provided. Thus, with the frames approach, a user can select a curriculum area, view examples, and move to a new curriculum area quickly and efficiently.

Media. In the Knowledge Web pages, there are over 60 examples of student work in the three K/1 projects. As a virtual gallery, the Knowledge Web pages display three types of media: photographs, scanned images, and protocols. The first two, photographs and scanned images, can often be found on classroom bulletin boards. The third type, protocols, are not usually displayed because the time required to tape and transcribe them makes them impractical.

Photography is often used to display pictures of students' constructions, representations, and artwork as well as to capture classroom and group activities. The photographs displayed on the Knowledge Web pages are from still and digital cameras. Digital cameras create an electronic image that can be edited and viewed within minutes of taking the picture. Still-camera photographs must be developed either as a physical picture or as an electronic image, which delays their display time. Figure 2 shows some examples of the photography used in the Knowledge Web Pages.

Figure 2. Photography examples: group activities—K/1 corn.

A digital flatbed scanner is an invaluable tool for creating electronic (as well as print) media. The Knowledge Web pages use scanned images of artwork, original handwriting, sketches, surveys, charts, and graphs. The scanner works much like a color copier to quickly produce high-resolution images of students' original handiwork by creating an image that can be saved electronically or printed. Using the scanner allows for creating copies of student work, allowing originals to be returned. It also allows for simultaneous display of student work on the Internet and in the classroom. The majority of the examples on the Knowledge Web page were generated using a scanner and probably would not be available for display otherwise. Figure 3 provides some examples of scanned images in the Knowledge Web Pages.



He is going back in the water because he is scared. He is scared of a man chasing him. He is going to his home in the water. He is very, very nice. The sunshine is falling down.

This is the girlfriend otter. She is in her hole. The other otter is in the grass. You can't see his feet because they are down in the grass.

Figure 3. Examples of scanned media: artwork—preschool otter project.

Protocols such as typed transcriptions or audio sound bites, video clips of classroom activities, typed materials by students such as writing samples, and e-mail are all examples of communications made by students throughout the course of a school day. These communications are vital to the students' learning experiences but are often not available to parents. Figure 4 provides an example of an e-mail message displayed on the Knowledge Web page.

Date: Tue, 11 Feb 1997 08:45:43 -0600
>>X-Sender: deelen@mail.inhs.uiuc.edu
>>Mime-Version: 1.0
>>To: mv-burns@uiuc.edu (Marcia V. Burns)
>>From: deelen@denr1.igis.uiuc.edu (Timothy R. Van Deelen)
>>Subject: Re:Animal Snacks
>>
>>Good morning!
>>
>>Question number 1 (Do animals in the wild eat snack?):
>>
>>The short answer to this question is that some animals do and some
>>don't. Deer for example almost never eat large regular meals. They eat
>>nothing but snacks. When deer are feeding, they walk through the woods
>>stopping every once in a while to take a bite or two of some tasty-looking
>>plant. They never stand in one place and eat the whole plant because that
>>might kill the plant and prevent it from providing food next time.
>>Bears usually like to eat big meals when they can catch other animals
>>for food like salmon or deer. But these kinds of meals are infrequent. In
>>between meals, bears like to snack on berries, ants, and roots. One of
>>their favorite snacks is honey.
>>Large snakes like the python never snack. They eat large meals when
>>they can catch a smaller animal and swallow it whole. Their meals depend on
>>being able to sneak up and catch smaller animals. Since catching smaller
>>animals is difficult, pythons may wait several weeks between meals. (You'd
>>think they would want a snack).

Figure 4. Examples of typed media: e-mail—K/1 snack project.

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Advantages and Value of the Knowledge Web

As the Knowledge Web pages were being developed, it became apparent that the concept of the virtual bulletin board has some advantages over the traditional classroom bulletin board. One advantage of the Knowledge Web is that there is no limit to the number of images. In addition, the electronic formatting is a quicker and more efficient method of displaying photography. These advantages are most prominent in the type of media that can be presented and in the communications among students, parents, and teachers.

Another advantage of the Knowledge Web pages was that they fostered communication among students and other adults (such as teachers and parents), among students, and among adults. First, the Web pages provided a catalyst for students' conversation about their project work. The classroom bulletin boards already are a useful medium to engage students in conversation about various classroom projects. However, the main audience for this conversation are teachers and other students because the bulletin boards are located only in the classroom. Parents often have less opportunity to view the displayed project work with their children. Creating a virtual bulletin board with the Knowledge Web pages provides parents with a means of viewing classroom project work with their children at home. It also allows parents to see project work without disruption. Parents can view these pages at home, at work, or anywhere they have Internet access. This convenience not only encourages parents to view more of the classroom activities, the predominant use of pictures and scanned images encourages viewing with their children, fostering communications and conversations.

The Knowledge Web pages not only encourage student–parent communication, they also encourage communication among students. The classroom computers are equipped with Web browsers with "bookmarks" to the school's home page and Knowledge Web. During Activity Time, students used these "bookmarks" as a starting point for Internet exploration. Thus, students could explore the Internet without an adult's assistance. Students enjoyed viewing their project work at school and were observed showing other children (and adults) how to use the browser to access the Internet and to conduct searches. It is not unusual to observe students viewing these Web pages with other students and parents and discussing the events surrounding the examples.

A final advantage of directly linking the curriculum to project work was realized during the construction of the Knowledge Web pages. The public nature of these Web pages encourages communication among colleagues and between parents and teachers. An e-mail link encourages feedback, and the public display makes the often-unavailable classroom bulletin board an additional resource for other teachers, educators, and researchers.

Use of Technology for Investigation and Documentation

This section describes the classroom where the technology has been used to document discussions, observations, predictions, stories, representations, and conversations during the course of project studies. With the aid of an audio recorder, a video recorder, a digital camera, and a 35mm camera, the documented materials can be displayed.

The computer is a tool that the 4-, 5-, and 6-year-old children use frequently to communicate their project's progress. The children write questions that they have about the project as well as their predictions and reports of what they found out. Most children appear comfortable using word-processing software, saving on a disk, and printing. A few children serve as mentors and assist others when there is a problem, even before the teacher is called.

Investigation

The computer also serves as one of the methods for investigating small-group or self-initiated projects. Children meet with the teacher to formulate the question that they wish to investigate. At that time, the teacher and child discuss what the child already knows about the subject matter and the ways in which she or he can research it. A list is generated that often includes searching on the World Wide Web for information and pictures. The children also decide in this planning stage how they want to report their research findings to the rest of the class. They choose from a long list of possible methods of presentation, including making a book or a script for a play or puppet show. Once again, the computer plays a significant role in allowing the child to create a book or script with type that looks neat and professional. The computer supports this

project-based, student-centered early childhood classroom in a way that allows children to pursue investigations in a more independent and engaging way. This independence allows children to work at their own rate rather than wait for a teacher or parent volunteer to write the questions for them, take dictation, or type the books when time permits. This independence also frees the adults in the room to engage in questioning and meaningful dialogue to help further and deepen the investigations.

Documentation

Documentation helps to "capture the moments" in order for the teacher to recall, comprehend, and prepare activities to facilitate the learning of concepts related to the project. "The documentation is used by the teachers to study children's ideas and approaches to learning. Such study can enable teachers to better know how to further support children in formulating and answering their own questions. The documentation can be used with children to help them revisit, reflect, and reconstruct" (Fyfe, 1994). The technology that assists the teacher in gathering documentation is vital. Often a video camera is best at Activity Time when lots of conversation is going on. In a whole class discussion, an audio tape recorder is moved around close to the speaker to catch the discussion. These conversations are then transcribed by the teacher to document concepts and thinking at that particular place and time, as well as to have a conversation with the child and read the conversations back to see if that is what they meant to say or for the child to clarify thinking. In addition, the conversation can be displayed on the bulletin boards and Knowledge Webs for parents to see what their child was thinking and how they expressed themselves on a particular day. Pictures taken with a 35mm camera or digital camera supplement the conversation and record the project in action, because a picture is worth a thousand words.

A wall display highlights the documentation of the stages or phases in the project investigation. The purpose of the display is to communicate understandings and to serve as a source of information. The public display provides a vehicle to connect parents not only to their own child's work but also to the work of other children. The display is important in communicating all phases of project work. The display for Phase 1 shows children's experiences prior to the study. In Phase 2, the display shares the processes of gaining new understandings through field work, research, representation, and follow-up activities. The documentation may show children interacting to solve a problem or present photos in a time sequence to show the steps a child uses in the investigation. The displays need to be aesthetically pleasing to invite parents, dropping off or picking up their child, to look at the documentation and materials presented, thereby facilitating communication between parent and child.

The documented conversations, representations, predictions, investigations, and photos are gathered for the third phase and final display of the project. Items are chosen by children and teachers that will best tell the whole story of "how" the children learned about the topic. Once again, families are invited to share in celebrating the knowledge, skills, and dispositions acquired through the project investigation. Technology (computers, cameras, and recorders) is valuable in assisting with the project, thereby helping connect education and families.

Photo Portfolios

Photo portfolios are collections of photographs assembled to tell about the life of a particular child, a particular project, or a particular phenomenon in the classroom. With photographs, teachers can document the intangible aspects of a child's daily activities—the smiles, friendships, patterns of choices, engagement, concentration, and intensity of a child's interest (Toren, 1997). Over the course of 2 years, the teachers have been refining their collection of photo portfolios and using them as tools to discuss the child's progress at parent conferences, to show the progression of one child through a project, or to demonstrate concepts across all children (for example, how many students represented symmetry in their representations). Photographs became tools for assessment, reflection, documentation, and communication.

Photographs enable the teachers to document events chronologically, providing them with a means to show parents and the public their investigative activities such as field trips, guest speakers, and field work. Individual portfolios may demonstrate to parents their children's learning styles, preferences, friendships, and strengths. One child's portfolio may exemplify her creative ability and her desire to work with artistic mediums. Another child's portfolio may demonstrate the active

nature of the child, the preference for using the "dramatic play area," or an interest in animals. The portfolios enable the parents to see the child in much the same way as the teacher does—how the child spends his or her time in school, and how the child demonstrates his or her interests and abilities in social or group situations. Photo portfolios are an addition to the child's cumulative portfolio and not a substitution for collected work samples, assessments, and artistic representations.

Chickscope

Chickscope was a collaborative project with many departmental units at the University of Illinois at Urbana-Champaign, the Champaign County Extension Unit, and the Beckman Institute. It provided students an opportunity to use interactive, real-time Magnetic Resonance Imaging (MRI) to view developing chicken embryos simultaneously while incubating eggs in their classrooms. University Primary School students were taught to manipulate the MRI scanner, which is housed at the National Center for Supercomputing Applications (NCSA), to study different views of the developing embryos. The students were "online" twice weekly throughout the incubation period, scanning in real time. Students at UPS were one of ten participating school sites. They had the opportunity through the Internet and their own home page to communicate their findings and questions with other students and the professionals supervising the project. They celebrated the birth of the chicks with a birthday party. More information about the entire project is described in Bruce et al. (1997).

Concluding Remarks

The tremendous advances in technology have eliminated the traditional boundaries of the classroom. At UPS, we have found that using this technology has been beneficial to the students' education. With computers, students are now able to operate sophisticated equipment like an MRI, search for information online, record their experiences, and communicate with individuals outside their classroom. Computer technology has also brought the classroom to the home through the use of Web pages as a virtual bulletin board. Digital cameras, scanners, and videotape photography are vital to the documentation and learning processes. Each of these items paints a different portrait of knowledge, dispositions, skills, and experiences that are being developed within the curriculum. As a result, parents, students, educators, and researchers can share the experiences that were once only viewed by those in the classroom. However, we have only touched the surface of what can be done with multimedia technology, and continued exploration and expansion of the uses of technology are essential to the vitality of the classroom.

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APPENDIX

Computer Resources Used to Create the Knowledge Web Pages

- Hardware

  Computer: IBM 486 processor with at least 16M RAM (a Pentium with 32M RAM is preferred), 1G hard drive (a zip drive is useful for archiving images)

  Flatbed scanner for scanning photos and original work.

  Digital camera (or a still camera and opting for photos on disk during development).

  Video camera for recording video images and sound

  Tape recorder for recording sound bites

- Software

  HTML editor from a commercial word-processing package such as WordPerfect® or a Web page editor such as MicroSoft FrontPage® 97.

Image editor that can save images/pictures in *.jpg or *.gif formats.

Scanner software, which usually comes with the scanner and interfaces with the image-editing software.

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Using Technology to Link Families and Schools to Research-Based Information

David Osher & Stephanie Snow ■

Abstract

A historic problem in knowledge use is the gap—the disconnect—between research and practice. This gap is particularly noticeable in the education of children with disabilities and of others who are placed at risk of school failure—areas in which the United States Department of Education has invested significant research and development resources. This paper discusses how the Internet may be employed to address this disconnect by linking researchers, practitioners, and families and by connecting family members and practitioners to useful and usable information about practices based upon and validated by research. The paper first examines the research–practice gap and briefly identifies effective approaches to addressing that gap. It then examines the promise that the Internet presents, as well as barriers to its effective use. Finally, strategies and tactics to leverage the opportunities presented by the Internet and to address the potential problems that may weaken their impact are examined.

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Introduction

A historic problem in knowledge use is the gap—the disconnect—between research and practice. This gap is particularly noticeable in the education of children with disabilities and of others who are placed at risk of school failure—areas in which the United States Department of Education has invested significant research and development (R&D) resources. While federally supported R&D has produced an impressive knowledge base regarding effective practices and tools, family members and practitioners rarely draw upon this resource when they make decisions concerning which interventions they might employ (Carnine, 1997; Malouf & Schiller, 1995; U.S. Department of Education, 1995).

This paper will suggest how the Internet may be employed to address this disconnect by (1) linking researchers, practitioners, and families, and (2) connecting family members and practitioners to useful and usable information about practices based upon and validated by research. In order to do so, the paper will first examine the research–practice gap and briefly identify effective approaches to addressing that gap. We will then examine the promise that the Internet presents, as well as the barriers to its effective use. Finally, we will examine strategies and tactics to leverage the opportunities presented by the Internet and to address the potential problems that may weaken their impact.

Understanding and Addressing the Disconnect between Research and Practice

The research–practice disconnect reflects both cultural factors and the social structuring of how individuals organize their work and home lives, as well as how they exchange information with others. Cultural factors can be conceptualized as the existence of divergent knowledge communities that are organized around discrete values, rituals, and institutions. Structural factors involve those characteristics of families and practitioners that hinder knowledge exchange, as well as those characteristics of how individuals produce and employ knowledge that minimize the sharing of information between and among researchers, school-based practitioners, and family members.

Cultural Factors

Researchers, practitioners, and families participate in different knowledge communities, each of which has a different set of beliefs, interests, incentives, and evaluative criteria (Osher, 1995; Fuhrman, 1992; Huberman, 1983, 1985). While some members of each of these groups participate in more than one community, each community has its own approaches to developing and exchanging knowledge. Researchers, for example, frequently communicate through research meetings and refereed journals, a mode that is rewarded by tenure committees and peer recognition. Practitioners most often look to fellow practitioners for new knowledge and are sometimes rewarded for attending practice-oriented workshops and practitioner meetings (Osher & Kane, 1993). Family members of children with disabilities often look to one other, to other families or disability organizations, and, in some cases, to other members of their social networks (McInerney, Osher, & Kane, 1997).

Structural Factors

The disconnect also involves two forms of structural isolation. The first is the isolation of practitioners and family members, both from one another and from other members of their own knowledge communities. This isolation limits the ability of all concerned to observe practice-based knowledge in an optimal environment. The second involves the isolation of practice-oriented knowledge in various separate sites—which makes much information essentially invisible to other practitioners, researchers, and family members.

While most practitioners and family members are interested in learning from the practical experience of their peers, they are separated, structurally, from these peers and from the environments in which they work or live. Sometimes their isolation is physical. Teachers, for example, may work in isolated classrooms (Darling-Hammond & McLaughlin, 1995; Rosenholtz, 1989; Huberman, 1983; Little, 1981; Lortie, 1975) or schools, and family members are often isolated in their homes or immediate communities. Other times, the isolation is a function of time and the pressure of addressing the needs of children with disabilities. Teaching and child-care schedules may not support meeting attendance or site visits, for instance. Finally, the isolation may be resource based—neither teachers nor parents may be able to afford the costs of travel or conference and workshop fees. (There also may be a cultural component to isolation. Members of different knowledge communities may also be divided by matters of race and ethnicity, language and culture, and intellectual orientation.)

Research Results

While knowledge use is always local, knowledge "transfer" is frequently conceptualized, described, implemented, and even evaluated in a "top-down" manner that views knowledge as produced by researchers and disseminated to practitioners, who then apply the research. Such an approach does not capture the concerns and experiences of the end users of research-based information—in this case, family members and school-based practitioners. During the past 4 years, researchers at the American Institutes for Research have conducted three sets of studies that examined knowledge use from an end-user's perspective. Our studies included focus groups, surveys, and analyses of national, state, and local infrastructures of information support. The results of this research provide a "bottom-up" picture of knowledge use from a local as well as an end-user perspective (McInerney, Osher, & Kane, 1997).

Focus Groups. The 20+ focus groups that the American Institutes for Research conducted with family members and practitioners highlight the importance of both cultural factors (such as divergent evaluative criteria) and of structural factors (such as the press of time). Practitioners and families report that they find it hard to access credible and usable research-based information—particularly when and where they need it. Furthermore, they rarely attend research meetings, and when they do, they often feel marginalized by agendas and rituals that do not include them. Similarly, they rarely read research journals, the language of which they frequently find inaccessible. In addition, practitioners and families are more interested in peer validation of interventions than tests of statistical significance, and in context-rich studies that enable them to reflect on the possibilities of adapting a practice than context-stripped studies that focus on general principles (House, 1981; Mishler, 1979).

Survey Data. Data from a recently completed "information needs sensing," which the Center for Effective Collaboration and Practice (CECP) sent to

teachers and family leaders from all 50 states, suggest how various populations and state respondents from mental health, juvenile justice, child welfare, and Head Start staff currently access information regarding children and youth with emotional and behavioral problems and disorders. When asked to identify where they went for information, the top three categories for family respondents were family support and advocacy organizations, other families, and conferences and workshops, while the top three for teachers were school psychologists, conferences and workshops, and behavioral consultants or specialists. When asked to evaluate which information sources were most accessible, family members most frequently mentioned family support and advocacy organizations, other families, and libraries. Table 1 summarizes some of the relevant findings from the information needs sensing.

Table 1

Where Do You Go for Information about Children and Youth with Emotional or Behavioral Problems?

Families	Teachers
68% family support & advocacy organization	21% school psychologist
22% another family	16% conference or workshop
11% conference or workshop	9% behavioral consultant

Two other studies have mapped the national (and in some cases state and local) infrastructure that families and school-based personnel can draw upon to gain information and support in order to improve outcomes for children with disabilities. These studies evaluated the flow of information and support from two perspectives. From a top-down perspective, we examined the flow of information and support from the national infrastructure down to the states and local communities across the country. From a bottom-up perspective, we evaluated the capacity of this infrastructure to be responsive to local needs in helping families and educators access information and obtain support for their children and students. Our findings suggest that while there is a rich national and state infrastructure, which is described in Figure 1, unfortunately, this infrastructure is fragmented, underused, and not well aligned. In addition, end users suggest that this infrastructure is hard to access, particularly by families who often face additional barriers of culture, geography, and social class.

Strategies to Address the Research–Practice Disconnect

A variety of strategies can be employed to (1) address the concerns of end users, (2) build upon the infrastructure, and (3) reduce the research–practice gap. Some strategies involve linking researchers, practitioners, and families in collaborative research (Englert & Tarrant, 1995; Guskey & Huberman, 1995). Others focus on actively involving practitioners and family members in the identification, conceptualization, implementation, evaluation, synthesis, and communication of information (Osher & Kane, 1993). CECP is employing these strategies in many of its undertakings to bring together and support the collaboration of researchers, practitioners, family members, and youth to identify, refine, produce, review, or communicate information.

Similarly, a variety of strategies can be employed to expand the range of sources that school-based practitioners and families draw upon when they respond to the challenge of improving outcomes for children, youth, and their families. These strategies, which we will explore during the remainder of this paper, include developing effective communication products that target specific audiences (e.g., Quinn, Gable, Rutherford, Nelson, & Howell, 1998); aligning the infrastructure of federal- and state-supported (or maintained) clearinghouses and technical assistance providers (Isaacs, Osher, Weidberg, Pisacane, & Sattler, 1998); employing "linking agents" to support identification and use of research based approaches (Havelock, 1995); and harnessing the potential of electronic technology, whether it be through cassette tapes, hyperlinked CD-ROMs, live video conferences (e.g., Osher & Hanley, 1996), or the Internet.

The Promise of the Internet and Its Limits

Essentially a network of computer networks, the Internet has the potential to link both isolated individuals and networks of individuals—in their homes, schools, libraries, and community organizations. Access to and use of the Internet have increased dramatically during the last few years. Originally the tool of a small number of research scientists, and then of individuals connected with large research institutions, the Internet is becoming increasingly important in everyday life. Surveys suggest that between 4% (Schwartz, 1996) and 9% (Goldberg & Richards, 1996) of Americans used the Internet in 1995, most of them for the first time. The National Center for Education Statistics found that nearly 8 of every 10 public schools in the nation had access to the Internet as of 1996, twice as many as in 1994 (NCES, 1997; Heaviside, Riggins, & Farris, 1997). The study also showed that the percentage of classrooms, computer labs, libraries, and media centers that are connected to the information superhighway increased from 3% in 1994 to 27% in 1997 (Trotter & Zehr, 1998). In addition, the American Library Association's Office for Information Technology found that in 1997 over two-thirds of U.S. public libraries had Internet access (Bertot, McClure, & Fletcher, 1997).

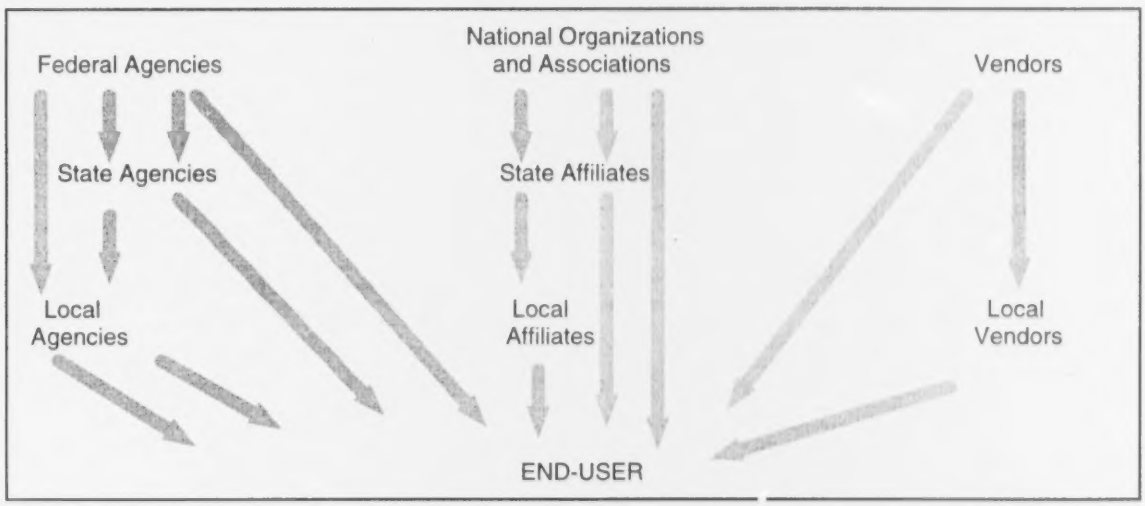

Figure 1. Infrastructure for technology.

While the promise of the Internet can be dismissed as hyperbole or "snake oil" (Stoll, 1995), the effective use of the Internet can help address the research–practice disconnect. When used effectively, the Internet can link researchers, family members, and school-based practitioners. With appropriate support, the Internet can bring information and support into sparsely populated frontier and rural areas (Byers, 1996; Odasz, 1994) as well as into densely populated but under-resourced inner cities. Similarly, the Internet can provide access to information to those whose mobility is limited by physical disability (National Council on Disability, 1996) or by lack of public transportation.

There are, of course, limits to the Internet's promise. Some limits involve the basic problem of access. Others involve the quality of available information. Still other limits involve how one can use the available information and the opportunity costs for accessing information via the Internet.

Equity of access is perhaps the major limiting factor. Anecdotal data suggest that the less economically advantaged a person is, the less likely he or she is to have access to the equipment (a computer and a modem), an Internet connection (an available phone line and software), the knowledge of how to use the software to make the connection, and the incentive or confidence to try to master the technology. Each of these factors constrains the possibility for Internet use. While a number of public (e.g., the Department of Housing and Urban Development) and private (e.g., Microsoft) efforts are targeting institutions in

economically disadvantaged communities, these efforts may not address key barriers to access (e.g., can one safely go to the public library or does the library schedule support Internet use by family members).

Another access barrier is a function of the rate and focus of innovation, as designers of sites on the World Wide Web (a component of the Internet) have more tools and technology to create very complex, exciting pages with large, animated graphics that respond to user input, but which are designed to work with the faster modems, more powerful computers, and cutting-edge software on the market. Unfortunately, many people, if they have access to the Internet and the World Wide Web at all, will have older computers, slower modems, and less powerful software that may not be able to handle these technological advances. In addition, screenreaders, which translate text on a Web page into sound output for users with visual disabilities, cannot process Web pages that employ advanced design techniques. As a result, information may remain out of reach.

The quality of information is a second major barrier. Searching, or "surfing," the World Wide Web can link individuals to a great deal of useful information. Unfortunately, Web surfing will also turn up information that is irrelevant, unreliable, and outdated. A basic Web search on a particular topic can produce tens of thousands of Web sites—an enormous quantity of information, much of which may be related only peripherally to the topic. The lack of regulation that provides free and unrestricted access to information makes a great deal of information available, but it also means that there is no way to ensure that the information is current, accurate, or relevant to the topic at hand. Consumers of information on the World Wide Web must develop strategies that enable them to weed out information that doesn't serve their needs.

Furthermore, knowledge use involves more than passively receiving information—it involves adapting and applying that information to new situations and new contexts. If individuals are to employ the Internet efficiently, they may need support, including strategies for searching for useful information and identifying appropriate resources, as mentioned above. Similarly, if individuals are to find the information they seek on the Internet, they also need to know how they will make use of what they find. Knowing one's goals, and where and how to look for information, is much like a road map to the Internet—with it, the chances of quickly finding one's destination increase, while without it, one may eventually reach the destination only after a great waste of time, energy, and effort.

The Center for Effective Collaboration and Practice—Bridging the Gap

People seeking information on the Internet need more than just a computer, a modem, and software; they also require support and knowledge of how to use the technology. Formidable as these barriers to effective use are, much is being done to address them and increase not just the promise of the Internet, but the actual results it delivers. The Center for Effective Collaboration and Practice (CECP), a center supported by the U.S. Department of Education's Office of Special Education Programs to improve services to children and youth with or at risk of developing emotional and behavioral disorders, provides an example of encouraging, supporting, and facilitating the use of technology among the various practitioner and stakeholder communities.

CECP is linking individuals and various groups of people via the Internet, through listservs, a Web site, and online discussion groups. In addition, CECP is working with an urban and rural community-based organization to assist them in acquiring and mastering technological communication and to learn about how they overcome barriers to effective use. The first year of CECP's foray into the field of technology has yielded a good amount of experience and insight, and much has been learned.

Listservs. Currently, CECP runs 12 listservs—computer programs that distribute electronic mail (e-mail) to a group of participants. Any participant can send a message to the listserv, which will forward it on to the entire group. In addition to smaller lists for various working groups, CECP administers larger listservs for the following:

- discussion of the 1997 Amendments to the Individuals with Disabilities Education Act (IDEA),
- family members of children and youth with emotional and behavioral disorders (EBD),
- school psychologists, and
- state consultants and specialists in EBD.

Listservs can function as a discussion forum or as an e-mail newsletter to connect people with one another and with resources, such as citations for books and journal articles, Web sites, and contact information for people and other organizations. Subscribers (a technical term for participants—there is no cost to be on a listserv) can submit questions, comments, resources, or advice to large numbers of people very quickly. Even simply "lurking" (subscribing and reading, but not posting messages) can provide information through "listening" in on discussions, allowing people to draw upon one another's experience and expertise quickly. In addition to those it maintains, CECP offers access to an extensive collection of listservs on a variety of topics maintained by other organizations.

Web Site. CECP has developed an extensive Web site (http://www.air.org/cecp) to accomplish a variety of purposes:

- to introduce users to CECP, its mission, staff, and plan of work;
- to link users to organizations, researchers, and others with whom CECP is collaborating;
- to provide access to important documents, such as the proposed regulations to the 1997 Amendments to the IDEA or a monograph on functional behavioral assessment;
- to interact with users via a needs assessment and online discussions (see below); and
- to connect users to other information sources through a large collection of links to other Web sites.

Ever-expanding, the Web site is frequently edited as new resources become available and old ones need updating. CECP staff also post conference announcements, newsletters, and other resources from our collaborators who may not have their own Web sites. In addition to the more conventional resources such as documents and links, CECP also offers interactive discussions six to eight times a year.

Online Discussions. One of ways CECP most directly addresses the disconnect between research and practice over the Internet is through online discussion forums. Building on a model developed by the National Center to Improve Practice in Special Education through Technology, Media and Materials (NCIP), CECP hosts interactive programs called "Author Online" and "Online Expert," in which an author of a recent research article or an expert in a particular field spends 3 weeks answering questions and moderating a discussion on a particular topic. The article or relevant background material is available on the Web site, providing an opportunity for the nonresearch community to interact directly with the author or expert to clarify particular points, request more information, or respond with personal experience. The forums also allow researchers to make direct contact with the people their research is intended to serve.

Outreach. Another component of CECP's work in using technology to bridge the research-to-practice gap are outreach projects in Richmond, Virginia, and a rural community in West Virginia. The projects are designed to assist a parent group in each community in the acquisition of computers, Internet access, and knowledge and skills to use them. The project also documents the process that communities employ so that it can be replicated in the future. For example, staff from CECP traveled to Richmond to do a presentation and training on accessing information via the Internet, using the CECP Web site as a point of reference. In follow-up activities, CECP staff are supporting and assisting the parent group in Richmond as they survey the information needs of their community, build a database to analyze the results, and design and construct a Web site for the community. Similarly, family members from the Richmond site shared their knowledge about using computers with members of the family organization who attended workshops at which Richmond representatives presented.

Lessons Learned. The various activities undertaken by CECP to employ technology to bridge the research-to-practice gap have provided a great deal of insight into how best to proceed. One lesson is that the various components of the Internet work well together. When an online discussion approaches, CECP publicizes it through the various listservs as well as traditional newsletters and journals, and many people respond via e-mail to say that they are excited about the topic and are looking forward to the discussion. Conversely, we have also learned that many people only have access to one component of the Internet. Not everyone who has e-mail can

get on the World Wide Web, and vice versa, although free Web-based e-mail is increasingly available. Therefore, CECP makes sure to always provide a toll-free number people can use to order hard copies of resources available on the Web site and to make use of print media, not just e-mail, to advertise online discussions.

In addition to lessons learned through basic experience, CECP actively solicits feedback about its Web site via both the Web and e-mail. A "guest book" page on the Web site allows visitors to send their thoughts and comments. In addition, at the bottom of each page on the Web site is an e-mail icon that will send a message to CECP staff, which is especially useful if a particular page malfunctions. A large number of comments that CECP has received thank us for creating a site that uses minimal graphics and no complicated programming, assuring that it will load quickly. Many people who do have access to the Internet are often using older technology, and they experience a great deal of frustration when pages take 2 to 4 minutes or longer to load, or fail to function altogether.

A final insight CECP has gleaned from its work in this area is that many people, for a variety of reasons, fear technology, and that a helpful person supporting them in their explorations of the virtual frontier can assuage many discomforts. CECP staff provided such support at the 1997 annual meeting of the Federation of Families for Children's Mental Health, where they had an information booth with a laptop computer hooked up to the Internet to display the CECP Web site and demonstrate how to use the Internet, and even how to write Web pages using just a word processor and browser. Many people were hesitant to even touch the computer, but often, once they learned the basics, marveled at the possibilities and vowed to bring the information home to their organizations, districts, and communities, which demonstrates that resources, knowledge, and skills can be disseminated through a handful of willing, committed people.

The research-to-practice gap remains a formidable problem. Both cultural (disparate knowledge communities) and structural (physical isolation, time constraints) factors impede the ability of family members and practitioners to take advantage of the expanding knowledge base of effective practices and tools. Focus groups and surveys have collected important data regarding how family members and practitioners seek out and use information, what useful information looks like to them, and what barriers they encounter trying to access and use it. This research has yielded a variety of strategies for addressing the disconnect, including both linking members of the various communities to one another and actively involving families and practitioners in the development of information products. In addition, various strategies are being employed to expand the range of sources available, such as harnessing the potential of electronic technology, including the Internet.

Studies show that access to the Internet is expanding at an increasing rate. The Internet is a useful tool for addressing the disconnect between research and practice because it can link members of different knowledge communities, bring information and support into areas that lack them, and provide access to information for those whose mobility is limited. However, as promising as the Internet may be, barriers remain in the form of access problems, inconsistent information quality, and lack of strategies for knowledge use. The Center for Effective Collaboration and Practice is employing listservs, a Web site, online discussion groups, and outreach projects to use the Internet to get valuable information into the hands of family members and practitioners, and to assist communities in acquiring not only computer equipment and Internet technology, but also the skills and support to use them effectively.

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Using Technology to Develop Programs of School, Family, and Community Partnerships

Beth S. Simon, Karen Clark Salinas, Joyce L. Epstein, & Mavis G. Sanders ■

Abstract

The National Network of Partnership Schools at Johns Hopkins University's Center on School, Family, and Community Partnerships was established by researchers to guide schools, districts, and state departments of education to create positive, permanent programs of partnership, to recognize and disseminate their efforts, and to learn from the various approaches that are implemented in diverse policy environments and at all levels of schooling. The Web site *(http://www.csos.jhu.edu/p2000)* for the National Network of Partnership Schools is designed as a technological tool to help members develop, maintain, and improve their partnership programs. The Web site consists of eight main sections that organize the content. From the eight "buttons" on the home page (*Partnership Program, Membership, Frequently Asked Questions, Membership Services, Publications, In the Spotlight, Contact the Staff,* and *Links*), visitors branch off into content-rich pages that describe the information necessary to become a member of the Network and to strengthen current members' partnership programs. This paper takes the reader on a "virtual tour," describing each section of the National Network of Partnership Schools' Web site. Future plans for the Web site are also discussed.

■

Introduction

Most schools want to improve school, family, and community partnerships, but most have not reached their goal. Indeed, developing good connections between home, school, and community is an ongoing process that takes time, organization, and effort. Based on more than a decade of research and the work of many educators, parents, students, and others, we have learned that, despite real challenges, it is possible for all elementary, middle, and high schools to develop and maintain productive partnerships with families and communities.

The National Network of Partnership Schools at Johns Hopkins University's Center on School, Family, and Community Partnerships was established by researchers to guide schools, districts, and state departments of education to create positive, permanent programs of partnership, to recognize and disseminate their efforts, and to learn from the various approaches that are implemented in diverse policy environments and at all levels of schooling. The guidance offered to members is based on the theoretical model of "overlapping spheres of influence" (Epstein, 1987) that states that students learn and grow in three main contexts—home, school, and community. Research supports the theory that students are more likely to succeed when home, school, and community work together, send common messages to students, and help students proceed with their education (Booth & Dunn, 1996; Epstein, 1996; Ryan, Adams, Gullotta, Weissberg, & Hampton, 1995; Schneider & Coleman, 1993). The knowledge gained in studies and fieldwork with many schools creates a base on which other schools can build.

Schools, districts, and state departments of education that are interested in developing and maintaining programs of partnership can join the Network to obtain support for their efforts. For each school, district, and state that joins, the Center will:

- Supply a handbook to guide the work of Action Teams.
- Issue a Certificate of Membership.

- Conduct semiannual training workshops at Johns Hopkins.
- Distribute *Type 2*, the Network's semiannual newsletter.
- Provide technical assistance by phone, e-mail, and Web site.
- Offer optional research and evaluation opportunities.

Members benefit from the experiences of others in the Network. In every edition of the newsletter, at training workshops, and through the Partnership Schools Web site, members have opportunities to share best practices, challenges, and creative options for improving school–family–community connections.

Since 1996, schools, districts, and state departments of education from across the country (and in American Department of Defense System schools in six countries abroad) have joined the National Network of Partnership Schools to develop school–family–community partnerships. As of the end of August 1997, over 650 schools, 60 districts, and 7 states were members of the Network for the 1997-98 school year. Other schools, districts, and states are in the process of completing membership forms for the 1997-98 school year.

Members of the Network are diverse in terms of demographic characteristics and starting points in partnership activities. Schools in the Network are located in large cities (25%), small cities (24%), small towns (18%), suburbs (22%), and rural areas (11%). The schools vary according to poverty status with 10 schools reporting no students receiving free or reduced-price lunch, 10 schools indicating 100% of students receiving free or reduced-price lunch, and the remainder of the schools falling in between.

Also, schools join the Network with different starting points for school–family–community connections, with some reporting connections with families as "low" and others as "high." Schools face a variety of challenges to partnerships. For example, some report that communicating effectively with linguistically diverse families is their primary challenge. Others indicate that planning activities and events that are responsive to the schedules of working parents is a key challenge they must address to better inform and involve all families.

The reported initial quality of the school–family–community partnership program also varies among the schools with 12% stating they had a "start-up program," 33% with a "fair/average program," 29% with a "good program," 19% with a "very good program," and 5% with an "excellent program."

Web Site—http://www.csos.jhu.edu/p2000

With such diverse membership, the Network must offer information and support in varied ways. An interactive Web site is one way to provide information to all members and still retain personal connections and relationships that are at the heart of school, family, and community partnerships. The Web site *(http://www.csos.jhu.edu/p2000)* for the National Network of Partnership Schools is designed as a technological tool to help members develop, maintain, and improve their partnership programs.

In addition to helping each school, district, and state design its own responsive and effective program of partnerships, the Network's Web site links schools, districts, and state departments around the country so that information, support, and guidance may be shared. Thus, technology can decrease the sense of fear that educators and families often experience as they start to think about increasing collaborative activities, or the isolation that some schools feel as they begin to develop a program of partnerships. The Web site aims to help educators and families learn that many others are struggling with similar challenges in program development and school improvement, and that the Center on School, Family, and Community Partnerships at Johns Hopkins University is a place where they can obtain research-based materials and timely assistance.

Content Design

We designed the content of the Web site for two types of visitors: Network members and potential members. Potential members may review how to build a school–family–community partnership program, how to become a member of the Network, and what it means to be a member. Members benefit from a list of frequently asked questions that are updated on a regular basis and a place where members' success stories are spotlighted. For all visitors, we post information on contacting Partnership Schools staff, available publications, and links to other sites dedicated to school–family–community partnerships.

Technological Design

The Partnership Schools Web site contains a large amount of information for members and other visitors, so we attempt to present this content in a visually appealing layout. We arrange text so that visitors do not have to read across the entire width of a computer screen. Additionally, we chose a simple white background with colored text for ease in reading.

A unified look throughout the site was created by using similarly designed page headings and the National Network of Partnership Schools logo. The logo appears at the top of the home page and is the first graphic that visitors see when entering the site. The logo is also "buttonized" on the bottom of every page and may be clicked on to return to the home page.

The Network's Web site helps educators build partnership programs only if visitors can access its resources. We designed the Web site knowing that members use a range of technology. Some visitors may use a slow modem or a text-only browser, while others may have fast ethernet connections that allow for speedy downloading of graphic files. Some visitors' browsers may not be able to view frames, interpret java script, or use forms. Consequently, we try to avoid incorporating components that may frustrate users of low-end computers or browsers.

A Virtual Tour

We created eight sections on the Web site to keep the content organized and manageable. From the eight "buttons" on the home page (*Partnership Program, Membership, Frequently Asked Questions, Membership Services, Publications, In the Spotlight, Contact the Staff,* and *Links*), visitors branch off into content-rich pages that describe the information necessary to become a member of the Network and to strengthen current members' partnership programs.

In the remainder of this paper, we take the reader on a "virtual tour," describing each section of the National Network of Partnership Schools' Web site. Visitors select the order in which they view the sections based on their interests. As a result, some information is presented in more than one section so that visitors can easily access related topics. We begin our discussion with *Partnership Program*, the section that explains how to build school–family–community connections.

Partnership Program

This section of the Web site introduces the main components that help schools, districts, and states develop their partnership programs. The components and all related information and forms are provided in the Network's handbook: *School, Family, and Community Partnerships: Your Handbook for Action* (Epstein, Coates, Salinas, Sanders, & Simon, 1997). These components on the Web site include: Epstein's framework of six types of involvement, the Action Team approach, planning and evaluating partnership practices, district and state leadership, training workshops for Action Teams and end-of-year celebrations, budgets and funding, and ten steps to school–family–community partnerships. Visitors may click on these components for information.

Epstein's Framework of Six Types of Involvement

The framework, based on research and on fieldwork in elementary, middle, and high schools, helps educators develop comprehensive programs of school and family partnerships by focusing on Type 1—Parenting, Type 2—Communicating, Type 3—Volunteering, Type 4—Learning at Home, Type 5—Decision Making, and Type 6—Collaborating with the Community. The six types of involvement are not hierarchical or mutually exclusive, because each type is important for producing different results. In addition, some partnership practices cover more than one type of involvement. For example, a family literacy program is both a Type 1 activity because it helps parents improve their own skills and a Type 4 activity because it enables parents to help their children with reading at home. Ideally, a partnership program includes practices from all six types of involvement that are implemented, improved, or maintained during each school year.

Visitors may click on links to view *sample practices* for each type of involvement, *challenges* that must be met, *redefinitions* of basic principles of involvement, and various expected *results* for students, parents, and teachers.

Sample Practices. This link includes several common practices for each type of involvement that have been effectively implemented in many schools and at different grade levels.

Challenges and Redefinitions. Visitors who click on this link see that each type of involvement has particular challenges that must be met in order to involve all families at all grade levels. Each type also requires redefinitions of some basic principles of involvement for an up-to-date understanding of diverse needs of families. A few examples of program-design features that will enable schools to meet the challenges are listed. Meeting the challenges turns an ordinary partnership program into an excellent partnership program.

Results. Each type of involvement leads to different results for students, families, and teachers. This link on the Web site provides a few examples of benefits that have been measured or observed for each type of involvement. Members of the Network are guided to select or design practices of partnership that will reach specific goals that are set by their school. For example, the lists of results show that Type 1—Parenting activities may help families understand their role in getting their children to school on time and, thereby, improve attendance. By contrast, Type 4—Learning at Home activities may help families and children interact on math homework and, thereby, help students complete their homework and build their math skills.

Action Teams for School, Family, and Community Partnerships

The Action Team for School, Family, and Community Partnerships is the "action arm" of a partnership program and an important part of a school improvement team, if one exists. The Action Team assesses present partnership practices, organizes new partnership activities, implements selected activities, evaluates next steps, and continues to develop and coordinate practices for all six types of involvement.

This link explains that the Action Team members include two to three teachers from different grade levels, two to three parents with children in different grade levels and/or the parent liaison or parent association officer, and one administrator. Action Teams may also include business partners or other community members, students in middle and high schools, and others who are central to the school's work with families such as the nurse, guidance counselor, school social worker, or others. Diverse membership is important so that partnership activities account for the various needs, interests, and talents of educators, families, students, and the community.

Each member of the Action Team serves as a chair or co-chair of a committee for one of the six types of involvement. A team with at least six members (or as many as twelve) ensures that leadership responsibilities are delegated so that one person is not overburdened and the work of the Action Team will continue even if members move or change positions.

Planning and Evaluation

This link from *Partnership Program* summarizes the forms that have been created to help Action Teams for School, Family, and Community Partnerships plan, implement, and evaluate their work. Using these forms that are in the handbook, all Action Teams can:

- Complete an inventory of present practices of school–family–community partnerships.
- Outline a vision of how practices of partnership will develop and improve over 3 years.
- Prepare a detailed 1-year action plan indicating how the Action Team will schedule and conduct activities to reach specific results for 1 school year.
- Evaluate their school, family, and community partnerships program each year in order to continue improving practices.

District Leadership

This page on the Web site describes how district leadership can help every school develop strong programs of school, family, and community partnerships by establishing district policies and procedures that facilitate and recognize the work of Action Teams, and by identifying and coordinating all district-level programs and activities that involve families and communities. District-level facilitators can help their schools set a course, stay on course, reach their goals, share ideas with one another, and continue their plans and programs. In districts with 15 schools or more, full-time facilitators conduct training, planning, networking, and technical assistance activities.

State Leadership

This page lists the responsibilities of state leaders such as establishing state policies and procedures that will help their districts help all schools develop strong programs of partnership, and identifying and coordinating all state-level programs and activities that involve families and communities. A state-level

department for school, family, and community partnerships may provide training, funding, and recognition, support research and evaluation, and work with state colleges and universities and business and industry. Ideally, state and district leaders will work together to offer schools expertise and resources that will ensure successful partnership programs across the country.

Training Workshops and End-of-Year Celebrations

This link describes two different kinds of workshops conducted by state coordinators, district facilitators, or school leaders that are designed for Action Teams for School, Family, and Community Partnerships or other audiences interested in developing programs of partnership. The workshops present a common vocabulary, background, and processes that enable educators, parents, and others to talk and work together to build their programs of partnership. The Training Workshop includes a warm-up activity, information on the six types of involvement, the Action Team approach, a focus on results, and next steps. The End-of-Year Celebration Workshop is conducted to recognize progress that is made each year in improving school–family–community partnerships. It helps organize presentations on best practices, panel discussions on problems and solutions, school exhibits, and continuation plans.

Budgets and Funding

Even a basic school–family–community partnership program requires some money to implement activities such as mailing newsletters or serving refreshments at back-to-school night. Well-developed partnership programs require larger budgets to implement more extensive outreach or larger numbers of practices. District and state partnership programs require budgets for staff and program costs. Compared to other school improvement initiatives such as curriculum reform, school–family–community connections is a relatively inexpensive program. For many schools, districts, and states, funds are available in Title I, Title VI, and other federal and state initiatives. Some schools, districts, and states write proposals and receive funding from foundations, businesses, and other local and national sources. This link on the Web site includes a list of sources and levels of funds that are helping Network members develop programs of partnership. Securing funds and making school, family, and community connections a line item in a school, district, or state budget ensures strong, permanent partnership programs.

Ten Steps to School–Family–Community Partnerships

This final link from *Partnership Program* ties the components of comprehensive partnership programs together in a useful list. With help from district and state leaders, schools should create or identify an Action Team, obtain funds and support, provide training and guidelines to Action Team members, identify present strengths and weaknesses of the current partnership program, develop a 3-year vision, write a 1-year action plan, enlist help from others to conduct activities, evaluate practices and their results, conduct an annual celebration of progress, and continue working toward a comprehensive, ongoing, positive program of partnerships.

Membership

This section of the Web site explains the membership requirements that schools, districts, and state departments of education must meet to become members of the National Network of Partnership Schools. Members work with the Center on School, Family, and Community Partnerships to improve connections with students, families, and communities. There is no fee to join the Network, but there are membership requirements.

Schools agree to:

- Create or identify an Action Team for School, Family, and Community Partnerships.
- Use the framework of six types of involvement to plan a program of partnerships.
- Allocate an annual budget for the work and activities of the Action Team.
- Communicate annually with the Center to share plans and progress.

Districts agree to:

- Assign a full-time facilitator to work with Action Teams in 15 to 25 schools on their plans, implementations, sharing of activities, and connections with the Network. (Districts with fewer than 15 participating schools may propose a part-time equivalent facilitator.)
- Allocate an annual budget for the work and activities of the district staff.

- Assist each participating school to fulfill the requirements for the school level (listed above).
- Communicate annually with the Center to share plans and progress.

States agree to:

- Create or identify an Office or Department for School, Family, and Community Partnerships.
- Assign the equivalent of one full-time professional coordinator and adequate staff to conduct leadership activities for school–family–community partnerships across districts.
- Allocate an annual budget for the work and activities of the state's Department for School, Family, and Community Partnerships (see above) to support the districts and schools in the Network.
- Assist participating districts and schools to fulfill the requirements listed for district-level and school-level members of the Network (listed above).
- Communicate annually with the Center to share plans and progress.

Visitors click on the membership level of interest to them (school, district, or state). In an ideal system, the membership levels will be linked—districts organize and support the work of schools, and states organize and support the work of districts. However, in the Network, schools may join with or without their districts, and districts may join with or without their state. On the Web site, each membership level is linked to the other levels so that visitors have easy access to requirements they may be responsible for supporting. The membership requirements pages contain links to detailed explanations of the six types of involvement and the Action Team for School, Family, and Community Partnerships—both key components of the Network.

After visitors have read the membership requirements, they may request a membership form online. By completing a simple form, individuals may request that an invitation and membership forms be sent to them at their mailing address. Visitors without a forms-capable browser may use our e-mail address, telephone number, or mailing address to request membership forms.

Frequently Asked Questions

Each school, district, and state will develop, implement, evaluate, and improve its own school–family–community partnership program tailored to the goals, needs, and interests of each location. There are, however, common questions and concerns that may be shared across sites. In this section of the Web site, we share frequently asked questions from members and answers from the staff. The Partnership Schools staff has addressed questions pertaining to such issues as meeting partnership challenges, allocating budgets, forming Action Teams, and planning meeting times for the Action Teams. When the staff's responses refer to Network components (i.e., Action Team for School, Family, and Community Partnerships, six types of involvement, *Type 2* Newsletter, training workshops, etc.), links are included to the pages on the Web site that provide additional information about the topic.

The Frequently Asked Questions section also contains a form that enables visitors to submit their own questions and ideas. We post selected questions that may be of interest to the Network and use e-mail to respond directly to those posing questions specific to a particular site. Again, visitors without a forms-capable browser can use our e-mail address and mailing address to submit questions and receive responses from the Network's staff.

The Frequently Asked Questions section begins to address the Network's goal of linking together the many schools, districts, and state departments of education that are working to improve school, family, and community connections. By posting members' questions and responses, we begin the dialogue within the Network.

Member Services

This section of the Web site outlines how the Center on School, Family, and Community Partnerships assists members of the National Network of Partnership Schools. The services provided by the Center are designed to give Network members information and technical assistance, ways of communicating with staff and members, and opportunities to participate in optional cross-site research and evaluation projects. Visitors may learn more by clicking on: *Handbook*, Training Workshops for Network members, *Type 2*, Staff, and Focus on Results.

School, Family, and Community Partnerships: Your Handbook for Action

One copy of *School, Family, and Community Partnerships: Your Handbook for Action* (Epstein, Coates, Salinas, Sanders, & Simon, 1997) is provided to Network members free of charge. This handbook is based on knowledge gained over many years talking and working with hundreds of teachers and administrators, and thousands of families and students in schools, towns, and cities across the country. The structures and processes in the handbook have been tested; materials have been developed and improved; and information has been expanded from the elementary to the high school grades. It is a "user-friendly" book designed to provide useful guidelines and tools that Action Teams can use to organize a comprehensive program of partnerships. The information, forms, and activities also help state and district leaders support, facilitate, and reward the work of their schools. The handbook's eight chapters (Background, Practical Applications, Workshops, Reproducibles, Plans and Progress, Group Activities, Special Topics, and Networking) offer step-by-step strategies to improve school–family–community connections.

Training Workshops for Network Members

This link provides visitors with a brief description and future dates of Training Workshops for Network Members that are conducted at Johns Hopkins University in Baltimore, Maryland. Twice each year, in March and June, Network members from states, districts, and schools are invited to an optional introductory workshop. The two-day workshops help participants conduct their own training workshops with their schools and move forward with their program development activities at the school, district, and state levels. There is no charge for the workshop, but participants must arrange and pay for their own travel, hotel, meals, and other expenses. To get a taste of the attractions in Baltimore, visitors can link to http://www.baltimore.com.

Type 2

This link introduces visitors to the semiannual newsletter of the National Network of Partnership Schools. *Type 2* shares examples of best practices, solutions to challenges, and guidelines for incremental improvement in program development. Members may submit articles and pictures about their partnership practices and progress. The first two issues of the newsletter are posted on the Web site, including Issues and Insights from the Director, Meeting the Challenge, State Line, District Record, School Report, and Research Briefs. *Type 2* is primarily disseminated to Network members. By including excerpts from *Type 2* on our Web site, we can share the information from the newsletters with a larger audience.

Contact the Staff

This page describes the Partnership Schools staff to visitors and provides contact information. Partnership Schools staff encourage dialogue with Network members by listing our e-mail address, telephone number, and mailing address on several pages. The staff cannot make site visits to every school, district, or state that joins the Network. Alternatively, we provide assistance by telephone, e-mail, and Web site to answer questions related to school–family–community partnerships and program development. The communications director for the Network responds to all e-mail, Web site comments, questions, and requests for more information.

Focus on Results

Each year, Network members are invited to participate in an optional research and evaluation opportunity called *Focus on Results*. The purpose is to learn about how practices of school–family–community partnerships help reach specific academic and school improvement goals. Members of the Network may voluntarily join the cross-site project to learn *which practices* produce *measurable results* for students, families, and the schools. The topic selected for *Focus on Results 1996-97* was student attendance. In 1997-98, we will explore how family and community connections help improve or maintain math achievement. Results from these studies will be shared with all Network members on the Web site, as well as in *Type 2* and other communications.

Publications

Many publications are available from the Center on School, Family, and Community Partnerships to help build strong school–family–community connections. This section of the Web site links to the following featured publications: *School, Family, and Community Partnerships: Your Handbook for Action*, *Type 2*, *Teachers Involve Parents in*

Schoolwork (TIPS), and *School and Family Partnerships: Surveys and Summaries.* Information for ordering these publications and others is provided.

School, Family, and Community Partnerships: Your Handbook for Action guides school leaders and district and state facilitators to plan, implement, and improve comprehensive partnership programs.

Type 2, the semiannual newsletter, provides timely information about member progress, new research, and dates for upcoming Network activities.

Teachers Involve Parents in Schoolwork (TIPS) is an interactive homework process that enables students to show, share, demonstrate, and discuss schoolwork with a family member. Manuals for teachers and prototype interactive homework activities are available for math in grades K–5 and science grade 3, and in language arts, science/health, and math for middle grades 6–8. TIPS activities are designed for all grades, all subjects, and all families.

School and Family Partnerships: Surveys and Summaries helps schools identify and analyze current partnership practices. Teacher and parent surveys for the elementary and middle grades and teacher, parent, and student surveys for high schools are available. Using the data from these surveys, schools can outline their 3-year vision and develop a 1-year action plan.

In the Spotlight

Members of the National Network of Partnership Schools are working hard to bring schools, families, and communities together in productive ways. To recognize members' achievements, we have dedicated a section on the Web site to spotlight promising practices. Following an annual call for "Best Practices," members submit practices that have proven to be successful in their partnership program. For example, we featured a school in Enfield, Connecticut, for its success with a schoolwide interactive homework project. The results of student–family projects were displayed in hallways throughout the school. Mt. Pleasant, Michigan, was spotlighted for its informational brochures that explained in parent-friendly language learning outcomes for each grade level. The brochures provided important information to parents and prompted teachers to review their curriculum guides and work toward district consensus on learning outcomes. Within the Network, there are many success stories, and the Web site is one of several places for recognizing and publicizing achievement and hard work on partnerships.

Contact the Staff

This section provides biographical information about the director, assistant director, communications director, dissemination director, and network coordinator of the National Network of Partnership Schools. Partnership Schools staff will answer all questions related to school–family–community partnerships and program development. We encourage dialogue with Network members by listing our e-mail address, telephone number, and mailing address on this page and several others.

Links

The Web site includes a section of links to Web sites of other organizations that members may find useful as they develop their programs of partnership. The Internet can be overwhelming to users in search of specific material. For members of the Network and other visitors, we identify sites that provide content related specifically to school–family–community partnerships. Our policy is to link to sites that offer a reciprocal link to our Web site.

Future Plans

The Network's Web site is constantly "under construction," adding and expanding features regularly. We plan to update sections, such as "Frequently Asked Questions," on a regular basis so that members will continue to visit the site to gain new and useful information.

Other plans focus on increasing the interactive component of the Web site. We want to increase two-way communication between and among members and the Network's staff. For example, we plan to establish a bulletin board so that members may post messages to obtain or share information, questions, and solutions to challenges with other visitors to the site. The Partnership Schools staff will monitor the bulletin board and respond to messages when appropriate.

We are considering the design and use of a listserv so that the Center can send out general weekly/monthly e-mail to all interested members. The content of this e-mail may include a summary of the week's bulletin board postings, a listing of upcoming events, or other important information.

Another interactive feature under consideration is a quick survey of visitors, such as a question of the month that visitors may respond to with a click on possible answers. The Partnership Schools staff will tally responses weekly and post the results.

Conclusion

The Web site for the National Network of Partnership Schools was designed as a technological tool to help members develop effective programs of school–family–community partnerships that are tailored to the needs and interests of each school, district, or state department of education. Its design meets several key principles for the effective dissemination of information for staff development and for program development (Katz & Rothenberg, 1996). The eight "buttoned" sections of the Web site aim to provide: (1) *good* information, not just *more* information, that can be processed and applied in practice; (2) clear concepts in effective and easy-to-read formats; (3) an appropriate degree of repetition to reinforce main ideas and to ensure that key structures and processes for partnerships are established; (4) content that is updated periodically to enable new and advanced programs of partnership to make continuous progress; (5) opportunities for members of the Network to share ideas, practices, problems, and solutions; and (6) a way for the Network to recognize and disseminate promising practices and new research results.

Not all members of the Network have access to the Internet yet. All information on the Web site is provided to members of the Network in print form. Those who do have Internet access may use the Web site as an additional source of good information to help them with their work. Members report their use of the Web site and other Network services annually. We will be charting the number of visits to the site, whether members of the Network use the site to contact the staff and obtain information, and whether new members sign up using the forms provided.

As the Network staff learns more about the needs and concerns of members, changes will be made to the Web site to maintain its usefulness and accessibility. To achieve this objective, the Partnership Schools staff must meet one of the challenges to effective programs of partnership—two-way channels of communication. Future plans for the Network's Web site will meet this challenge. We not only want to post information, but we also want to enable members and other visitors to communicate with the Partnership Schools staff and with each other so that they reach their goal of developing programs of school, family, and community partnerships that help more students succeed.

Acknowledgments

We appreciate the expert technical assistance of Renee Kling, Jon Grant, and Steve Choi in developing the Web site of the National Network of Partnership Schools, and the contributions of Michael Berka to the Web site.

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Contributors' Biographies

Amy Aidman's undergraduate work was in journalism and mass communications at the University of Florida, Gainesville, Florida, and included a year of study abroad at the Hebrew University of Jerusalem. She earned an M.A. in telecommunication arts from the University of Michigan and a Ph.D. in communications from the Institute of Communications Research at the University of Illinois (1993). Amy Aidman is a researcher and educator in the field of mass communications. Her areas of expertise include mass media and children, media literacy, and the social impacts of communication technologies. She has lectured and taught courses on these topics in the United States and in Israel. Her professional background includes coordinating information services, conducting research, and coordinating special projects for the ERIC Clearinghouse on Elementary and Early Childhood Education, as well as writing and producing video programming. The idea that communication technologies, if thoughtfully used, can have positive educational and social potential underlies her professional activities.

Ron Banks is the user services coordinator at the ERIC Clearinghouse on Elementary and Early Childhood Education. His primary duties involve responding to education-related reference questions received from the AskERIC system, 800-number phone line, and via U.S. mail; developing training and reference materials used in support of this service; performing administrative duties related to the user services department (e.g., compiling statistics); and training and managing user services staff. Ron has a master's degree from the University of Illinois at Urbana-Champaign in library and information science. After working for 3 years in health sciences library settings, Ron began work at ERIC/EECE in the summer of 1996. Prior to coming to ERIC, Ron worked for 15 years in the special education field in a variety of settings, primarily working with children and adults with moderate to severe disabilities. He has a master's degree in special education from the University of Illinois at Urbana-Champaign.

Jerold P. Bauch is professor of early childhood education at Peabody College of Vanderbilt University in Nashville, Tennessee. He is also director of the Betty Phillips Center for Parenthood Education, a research and development center at Vanderbilt. Professor Bauch has graduate degrees from the University of Florida and has taught at the University of Georgia and Peabody College. He has served as evaluator and consultant for Project Head Start since 1966 with a particular interest in parent and community involvement. Dr. Bauch was a continuing consultant to Indian Head Start programs from 1971 through 1993. At Peabody, he served as director of training for the DARCEE project and teacher education specialist with the Cognitive Curriculum for Young Children project. In the 1980s, he worked for the United Nations in the Republic of Panama, designing a model for the education of children in poverty. His recent international work was with programs for immigrant families in the Netherlands. Bauch is the editor of *Early Childhood Education in the Schools* published by the National Education Association and is a frequent speaker at state, regional, and national conferences. Most of his professional speaking, writing, and research has been on parent involvement. Dr. Bauch is the developer of the Transparent School Model, the award-winning plan for using electronic voice communications to link teachers and parents. His Center publishes the *Parent Involvement Report*, a newsletter for schools using the Transparent School Model. He conducts workshops and staff development programs on parent and community involvement for schools and other agencies and is the director of the Bridge Project.

Sandra L. Berger is the information specialist for gifted education at the ERIC Clearinghouse on Disabilities and Gifted Education, the Council for Exceptional Children (CEC). In addition to ERIC responsibilities, she has coordinated several federally funded projects related to gifted education, technology, and disabilities. Major publications include *College Planning for Gifted Students*, a step-by-step guide for discovering the right fit between a gifted

student and colleges. In addition, she has authored numerous articles and textbook chapters in the field of gifted education and technology, and she participates on several editorial boards. For the past several years, she has published a regular column, *Surfing the Internet,* in *Understanding Our Gifted,* a periodical for teachers and parents of gifted students. Ms. Berger holds an M.Ed. in special education and has received training in both counseling and technology. She is a frequent presenter at national and regional conferences on a wide variety of topics, including the integration of technology and curriculum.

Jay S. Blanchard (Ph.D. reading education, University of Georgia) is an associate professor in the Division of Psychology in Education, College of Education, at Arizona State University. He teaches graduate teacher education courses in technology, psychology, and statistics. A former Teacher Corps teacher, Dr. Blanchard is the author of *Computer Applications in Reading* (IRA), *The Computer in Reading and Language Arts* (Haworth Press), and *Modern Fiction about Schoolteaching* (Allyn & Bacon). He is a member (and former chair) of the International Reading Association's Technology, Communication, and Literacy Committee.

Jeanne C. Bleuer is the associate director of the ERIC Clearinghouse on Counseling and Student Services (ERIC/CASS) at the University of North Carolina at Greensboro. After receiving her B.S. in science education from the University of Illinois, she worked for 5 years as a research assistant in plant physiology in the University of Illinois Department of Agronomy. During that time, she earned an M.Ed. in guidance and counseling from the University of Illinois and went on to become a junior high school counselor in Dubuque, Iowa. She has held several counseling-related positions at both elementary and secondary levels and in a variety of settings, including serving as a vocational rehabilitation counselor at the Iowa State Juvenile Home for dependent and neglected youth. Dr. Bleuer completed her Ph.D. in educational psychology at the University of Michigan, where she was employed as the assistant director of the UM School of Education Consortium for Evaluation, Research and Training Services. Dr. Bleuer and Dr. Garry Walz have played a significant role in introducing counselors to computers and encouraging them to use computers creatively. Dr. Bleuer is the author of *Counseling Underachievers* and the co-author/editor of numerous other ERIC/CAPS publications. She and Dr. Walz were the co-recipients of the 1995 ACES Award for Publication in Counselor Education and Supervision and the 1996 AAC Award for Exemplary Practice.

Mark, Betsy, Stacy, Kelly, & Donald Blondin have had a variety of experiences in addition to their travel adventures. Mark earned his bachelor's degree in political science, worked for many years in the soft drink business, and is currently employed in the computer backup/mass storage industry. Betsy worked for many years as a legal secretary/assistant. She is completing her bachelor's degree, has been a reporter/photographer/copy editor for two northern Michigan newspapers, and is currently an editorial manager at a book publishing company. The children attend public school and are successful students. Stacy (13) and Kelly (13) swim competitively, and Donald (16) is on the varsity tennis team. The Blondin family lives in Carlsbad, California, near San Diego, and has published articles about their trip. They are working on a book and recently appeared on *Parent Soup,* an online parenting magazine.

Barbara Bowman is one of three faculty members who founded the Erikson Institute in 1966. She is an authority on early education and a nationally recognized advocate for improved and expanded training for practitioners who work with children and families. Mrs. Bowman, a past president of the National Association for the Education of Young Children (NAEYC), combines advocacy at the national level with a strong commitment to leadership and teaching. At Erikson, she teaches courses in early education and administration. She has also taught at universities in China and Iran. In addition, she has directed training projects for Head Start teachers, caregivers of infants at risk for morbidity or mortality, and preschool primary teachers and administrators. Her research has most recently focused on the public schools, specifically to introduce developmentally appropriate practices and authentic assessment in the early grades. She is a frequent consultant on parent support programs. Mrs. Bowman has served on numerous national boards and has also served on a variety of professional committees, including the Panels on Day Care Policy and on Prevention of Reading Difficulties in Young Children for the National Research Council, the leadership initiatives of the National Black Child Development Institute, the Community Initiatives Program of the Chicago Community Trust, the Advisory Council on Early Childhood Education of the Illinois State Board of Education, and the Early Childhood Series Advisory

Board for Teachers College Press. Mrs. Bowman earned her B.A. from Sarah Lawrence College and her M.A. from the University of Chicago. Honors include a D.H.L. from Bank Street College of Education.

Patty Burness served as the executive director of The George Lucas Educational Foundation, based in Nicasio, California, at the time of the FTE Conference. The Foundation was established in 1991 based on the filmmaker's belief that education is the most important investment we can make for our future. The Foundation disseminates information in several media to promote changes to the educational system; shares strategies for improving schools, especially those that integrate technology; and connects people interested in helping schools. The Foundation recently released *Learn & Live*, a documentary film hosted by Robin Williams, and a companion resource book that shares the good news about innovative schools and programs around the country. Patty was with President Clinton and Vice President Gore as they introduced *Learn & Live* to a broad audience at the Vice President's Family Reunion conference in June 1997. She has presented *Learn & Live* at the Jobs for the Future 1997 National Leadership Forum, the Democratic Leadership Council, Leadership America, and the National Education Computing Conference. Patty is a member of the Advisory Board for the Institute on Education and Training and has held positions on various boards, including the Urban Education Advisory Board of the Association for Supervision and Curriculum Development. Prior to joining the Foundation, she was chief of staff to Bill Honig, California's former state superintendent. She received a B.A. from Wheaton College in Norton, Massachusetts, and her M.A. from George Washington University.

Lillian Coltin, a project associate for the MOST Initiative, works with project staff on developing and disseminating materials through both print and electronic media. For the past 2 years, she has presented sessions at the National School-Age Care Alliance (NSACA) Conference and the Advanced School-Age Care Leadership Institute at Wheelock College on how professionals can use technology. Lillian has an M.Ed. in human development and family studies and an M.B.A. with a concentration in marketing. She has worked in both classroom and research settings with toddlers, preschoolers, and school-age children. She has also written on the importance of the physical environment in enhancing preschool children's experiences in child care centers. For 2 summers, Lillian has participated in the Child Care Design Institute sponsored by Tufts and Harvard Universities. In May 1993, she participated with a U.S. team on a study tour of child care programs and SAC training facilities in Denmark and Sweden. Lillian also works on the National Institute on Out-of-School Time (NIOST) training team to coordinate and develop materials for national training sessions for program directors, staff, and others interested in children's out-of-school time. She has co-authored several articles on school-age issues including articles in the *Yearbook in Early Childhood Education*, Vol. 5, *Issues in Child Care*, edited by Spodek and Saracho, published by Teachers College Press; *Conference Proceedings: International Perspectives on Children's Out-of-School Time* (1994); and the 1991 ERIC Digest *Approaches to School-Age Child Care* (with Michelle Seligson).

Edward J. Degnan is a senior research associate at the University of Central Florida (UCF) Institute for Simulation and Training. Mr. Degnan holds an advanced degree in industrial management from Lynchburg College and is currently enrolled in the Ed.D. program for educational leadership at UCF. Mr. Degnan recently retired from the military, where he spent 9 years working on design, analysis, and applications of interactive computer models and simulations for both the U.S. Army and the U.S. Air Force. Currently, he is involved in research and analysis for the development of an Interactive Simulation (IS) "Synthetic Environment," supporting military and non-military applications in the areas of education, training, operations, research, development, acquisition, testing, and evaluation. He has worked as a consultant on technology integration and "Dual Use" in schools and communities in three Florida school districts (Lake County—Tech 2000 Program, Seminole County—Tech Prep Program, and Orange County—Healthy Community Initiative).

Walid Elkhoury holds a B.S. in physics from the American University of Beirut and both an M.S. and a Ph.D. in mathematics from the University of Miami in Coral Gables, Florida. He has taught at both the high school and college level, and he has served as chairman of the mathematics department and academic dean at Ransom Everglades School, Coconut Grove, Florida. In 1994, Elkhoury joined the Latin School of Chicago where he continues to serve as director of mathematics, science, and technology programs. He has worked extensively with parents, students, and

faculty in creating an environment conducive to and supportive of change, especially in the area of technology.

Kendra Eller is working on her master's degree in early childhood education in the Department of Child and Family Studies at the University of Tennessee. As part of this program, she is currently spending a full year interning in the public schools working in kindergarten through third grade. She also has had many experiences with children from infancy through primary grades in a variety of settings.

Joyce L. Epstein, Ph.D. in sociology from Johns Hopkins University, is director of the Center on School, Family, and Community Partnerships and the National Network of Partnership Schools; principal research scientist in the Center for Research on the Education of Students Placed at Risk (CRESPAR); and professor of sociology at Johns Hopkins University. She has over 100 publications on the organization and effects of school, classroom, family, and peer environments, with many focused on school, family, and community connections. In 1995, Dr. Epstein established the National Network of Partnership Schools to demonstrate the important intersections of research, policy, and practice for school improvement. She serves on numerous editorial boards and advisory panels on parent involvement, middle grades education, and school reform. Dr. Epstein is a recipient of the Academy for Educational Development's 1991 Alvin C. Eurich Education Award for her work on family–school partnerships.

Anne Goldstein has been the director of the National Child Care Information Center (NCCIC), the Adjunct ERIC Clearinghouse for Child Care, since its inception in 1994. The Information Center, an activity of the Child Care Bureau, Administration for Children and Families, Department of Health and Human Services, is a central point of contact for child care information. In her capacity as director of the National Child Care Information Center, Anne has led workshops across the country on using technology as a communication tool and as a valuable resource for sharing information resources. Anne has been a child care professional for over 20 years. Her varied experiences include work at the community, state, and national levels. Anne's experience includes 5 years as a program director for a Community Service Agency that operates a comprehensive child care program, and emergency food, homeless shelter, and transitional housing programs in Reston, Virginia. For 15 years, she worked for a multi-site campus child care program in Montgomery County, Maryland, as a teacher, center director, and as the child care services manager. In addition to her Center-based work, Anne was an adjunct faculty member and taught early childhood courses for 8 years. Anne has been a child care consultant to parents, providers, employers, corporations, and state and local governments. Anne established the Montgomery County (MD) Child Care Technical Assistance Office and served as its project director for 2 years. Additionally, she was a founding member and president of the countywide child care directors organization. She has held several board positions with the Northern Virginia Association for the Education of Young Children (NVAEYC), including 4 years as chairperson of the Scholarship Committee. Currently, Anne serves on the Board of Directors of Reston Interfaith, Inc., and is a member of the Metropolitan Washington Child Care Mental Health Consultation Project.

Melissa Groves is an assistant professor in the Department of Child and Family Studies at the University of Tennessee. She has been teaching child development at the college level for more than 10 years but before that had several years' experience in preschool teaching. Her research interests lie in the professional development of early childhood educators and the impact of computer technology on learning.

Heidi Haugen is currently Cornell Cooperative Extension's Information and Technology Coordinator for the Reducing Risk and Increasing Capacity program. She holds a master's degree in communication from Cornell University. Heidi teaches community development professionals to use Internet technologies to support their programs. She also writes and edits two electronic newsletters, the RRIC Connectivity newsletter *Hot Lines from Heidi* and the RRIC *Grant Opportunities Update*, and is pursuing a Ph.D. in agricultural, extension, and adult education at Cornell.

Nancy B. Hertzog is an assistant professor in the Department of Special Education at the University of Illinois at Urbana-Champaign. Her research focus is in the areas of gifted education, differentiation of instruction, and project-based curricular approaches. She is the director of University Primary School, an early childhood gifted education program affiliated with the University of Illinois.

Susan Imel is director and adult education specialist, ERIC Clearinghouse on Adult, Career, and Vocational Education, the Center on Education and Training for

Employment, Ohio State University, Columbus, Ohio. She has considerable experience in program planning, teaching, administration, evaluation, information systems development and maintenance, and publications development in the areas of adult and continuing education, workplace literacy, and information systems. In addition to directing the ERIC Clearinghouse, she has managed a number of special projects funded by the Ohio Department of Education: Ohio ABLE (Adult Basic and Literacy Education) Evaluation Design Project, "Building Linkages for At-risk Youth and Adults in Ohio/For the Common Good"; Program Quality Enhancement Grant on Women and Literacy; and Program Quality Enhancement Grant on Small Group Learning. She is editor-in-chief of the Jossey-Bass sourcebook *New Directions for Adult and Continuing Education*, and she has published widely. Dr. Imel has made numerous conference presentations and given workshops on using ERIC resources and technology for adult education, adult literacy program planning, and professional development. She earned a Ph.D. in adult and continuing education and an A.M.L.S. in library science from the University of Michigan.

John W. Jacobs is a research associate for the Institute for Simulation and Training in the Distributed Interactive Simulation Education Group. Dr. Jacobs has 8 years of experience in developing and evaluating training and assessment systems used in the military, industry, and education. Dr. Jacobs also has over 5 years' consulting experience that includes overseeing training and assessment projects with Fortune 500 organizations. Dr. Jacobs received a B.A. and a Ph.D. in psychology from the Florida State University. He has worked as a consultant on technology integration and "Dual Use" in schools and communities in three Florida school districts (Lake County—Tech 2000 Program; Seminole County—Tech Prep Program; and Orange County—Healthy Community Initiative).

J. Michael Jaffe earned a B.S. in electrical engineering at the University of Michigan (1983), an M.S. in electrical engineering at the State University of New York at Binghamton (1986), and a Ph.D. in communication research at the University of Michigan (1995). Dr. Jaffe is an assistant professor in the Department of Communication at the University of Haifa in Haifa, Israel. J. Michael Jaffe conducts research, lectures, and writes on issues regarding computer-mediated communication (CMC) and health communication. His works have included studies on gender differences in computer network pseudonym usage and on computer use of interactive media to promote health education.

Michele Jarnigan has a bachelor's degree in early childhood education in the Department of Child and Family Studies from the University of Tennessee. Michele has worked 12 years in the University's Child Development Labs with infants and preschoolers. She has enjoyed the challenge of incorporating and integrating computer technology into her classroom teaching.

Marjorie Klein became a head teacher in a K/1 classroom at the University of Illinois Primary School in Champaign, Illinois, after having taught kindergarten for 27 years in a public school. She has a master's degree in elementary education and has had extensive training in implementing project-based curriculum.

Ken Komoski is the president of the Educational Products Information Exchange (EPIE) Institute and the founder and director of the LINCT Coalition (Learning and Information Networking for Community via Telecomputing). Since 1985, Mr. Komoski has been involved with community networking among the school, library, and home. Much of what he learned from the mid-1980s through the mid-1990s is recorded in a study funded by the MacArthur Foundation, "Creating Learning Communities: Practical, Universal Networking for Learning in Schools and Homes," published by the EPIE Institute in 1996. In 1985-86, Mr. Komoski became involved as an educational consultant with the planning of a community-networking project (the Battle Creek Plan) in Battle Creek, Michigan. In the early 1990s, he consulted on the development of the IRENE, a highly successful countywide network in Indian River County, Florida, that was awarded one of the first Department of Commerce TIIAP grants. In 1994, he became instrumental in developing LINCT-East, a five-town community network in rural eastern Long Island, New York. That effort led to his founding the LINCT Coalition in 1995. LINCT is a nationwide coalition of socially concerned, nonprofit organizations working together to help communities to achieve universal access to electronic information and learning via community networks and the Internet. Mr. Komoski lives in eastern Long Island, New York, with his wife Joanna Komoski, a family therapist. In his home town, he is known as a community activist, a tennis player, and a singer-songwriter of "new jazz standards."

Sharon Kristovich is a research analyst in the Office of Institutional Research at Parkland College. She has a Ph.D. in cognitive/academic psychology. She has had over 20 years of experience with computer technology and is currently a parent of two children enrolled at the University of Illinois Primary School in Champaign, Illinois.

Margaret Laney is a graduate student in sociology at California State University, Fullerton, with an emphasis in social research. She is also an ophthalmological assistant holding a COA license with a specialty as a refractionist. As a single mother of a 15-year-old son, she has been active in math and reading tutorial programs at the elementary school level. Her son, a computer maven, and his friends served as informants for this study. Her son has made significant progress in teaching her about computers.

Kate McGuire recently became the project coordinator for the MOST Initiative. She has a B.A. in psychology from the University of Colorado at Boulder, and an M.A. in women's studies from Rutgers University.

June P. Mead is a program evaluation specialist, Cornell Cooperative Extension, Cornell University. Dr. Mead has a Ph.D. in program evaluation and planning in the human services from Cornell University. Currently, she is the program evaluator for the Reducing Risks and Increasing Capacity (RRIC) project in New York and is facilitator for the Parent/Family National Outcome Work Group, part of the Children, Youth, and Families at Risk Initiative. Her current research focus is on evaluative research in the areas of substance abuse prevention and family resiliency programs for at-risk populations.

Jay F. Mulberry has a B.A. and an M.A.T. from the University of Chicago and an M.Ed. from Loyola University of Chicago. His career has been with the Chicago Public Schools as teacher, assistant principal, and principal. For the past 7 years, he has been principal of Jacqueline Vaughn Occupational High School. He is currently a Chicago Public School principal on loan to the University of Chicago, and he is also working as a consultant in educational technology on Internet and school improvement projects.

Dana McDermott Murphy obtained her doctorate in developmental psychology from Loyola University of Chicago in 1977. She also holds a national certification as a Family Life Educator. She is currently coordinator of the Parent Education Initiative (PEI) at the Latin School of Chicago, an independent K–12 school. The PEI is a unique school-based center for parent growth and development. Dr. Murphy is an adjunct professor at Loyola of Chicago and has developed and continues to teach in their M.Ed. program in family studies. She teaches courses in the areas of parenting over the life span, parenting in cultural context, and family communication and decision making. She also directs the Caring Project out of Loyola's Center for Children, Families, and Communities. Currently, she is helping a number of city and suburban public and private schools to create caring climates for learning and development.

Myron Orleans is a professor of sociology at California State University, Fullerton. He teaches, among other courses, classes on family, children, communications, and social futures. His recent research has focused on social aspects of computer use, particularly examining the impact of high levels of computer use on personal well-being and social interaction. He has presented papers at professional conferences and published in the *Social Science Computer Review* and in the collection of readings, *Sociological Studies of Telecommunications, Computerization, and Cyberspace*. He is married and has two children, a 14-year-old son who is a laptop enthusiast and an 11-year-old daughter who has bookmarked every Beanie Baby site on the Web.

David Osher is a senior fellow at the American Institutes for Research (AIR) and the director of the Center for Effective Collaboration and Practice, which focuses on children and youth with emotional and behavioral problems, and of AIR's Technical Support Contract with the Office of Special Education Program's Research to Practice Division, which focuses on technology for students with disabilities. Dr. Osher has written, published, and presented extensively in this area as well as in the areas of race relations, knowledge use, and organizational change. At AIR, Osher has worked with the Office of Special Education and Rehabilitative Services, the Office of Safe and Drug Free Schools, and the Office of Research and Improvement. In this capacity, he has also worked with the Office of Adult and Vocational Education of the U.S. Department of Education, the Center for Mental Health Services, and the Children's Bureau of the U.S. Department of Health and Human Services. Before joining AIR, Osher served as dean of a liberal arts college and of two schools of human services, and he consulted with state and community agencies.

Mihkel Pilv was born in Estonia. His educational career has followed a quite accidental path. He graduated from the university as a veterinary doctor, but in the early 1990s, a time of changes in the Estonian school system, he worked in the education field occasionally, starting a project with Tartu Katoliku Kool. Unable to withdraw from that project, he discovered that working in education was as interesting for him as was healing animals. So he took another "train," elementary education, and has had no regrets since. Mihkel's main job is director of the educational organization which in English is called MIKSIKE. The main function of this organization is to develop the interdisciplinary study program MIKSIKE for elementary schools.

Linda G. Roberts is a special adviser to the U.S. Department of Education on education technology. Her appointment, the first of its kind at the Department, was announced on September 2, 1993. In her position, Roberts will offer guidance on innovative ways that technology can be used to improve American education. Her leadership role for the Department builds on expertise in technology policy and broad experience in the field as teacher, researcher, university professor, and academic dean. Prior to joining the Department, Roberts was project director and senior associate with the Congressional Office of Technology Assessment (OTA). In 1991, she was named by *Electronic Learning* magazine as one of 10 "Educators of the Decade" for her direction of OTA's assessments, "Power On! New Tools for Teaching and Learning," and "Linking for Learning: A New Course for Education." Most recently, she directed a third comprehensive assessment on "Adult Literacy and New Technologies: Tools for a Lifetime." From 1981 to 1984, prior to joining OTA, Roberts tracked the growing use of computers in schools across the country and helped design programs to develop innovative uses of television, computer, and interactive video in the Office of Libraries and Learning Technologies and the Office of Educational Research and Improvement in the U.S. Department of Education. Dr. Roberts is widely recognized by the professional community as a leading expert in the application of technology to improve and reform education. She has served as an adviser to citizen groups, corporations, foundations, and state and local policy members. She speaks extensively on new technologies and learning in the United States and abroad and has testified before Congress on numerous occasions. Roberts' career started in 1962 when she was an elementary classroom teacher and reading specialist in Ithaca, New York, and Brookline, Massachusetts. She later taught elementary, secondary, and adult reading programs in east Tennessee. Roberts holds a B.S. from Cornell University (1962), an Ed.M. from Harvard University (1963), and an Ed.D. from the University of Tennessee (1973). She is married to Michael Roberts. They have a son and a daughter.

Anne S. Robertson works as the parenting educator on the National Parent Information Network (NPIN) project. Over the past 2 decades, Anne has worked as a parent volunteer, teacher, home visitor, parent educator, and researcher. She holds a bachelor's degree in psychology from the University of Illinois and a master's degree in international educational development from Boston University. She has had the opportunity to look at family and community development at the international level and in both rural and urban cultures. A key focus of Anne's interests is the development of successful educational systems that serve parents and families considered most at risk within the community.

Dianne Rothenberg is associate director of the ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE) and its special projects, PARENTS AskERIC and the National Parent Information Network. She is also owner of a dozen national electronic discussion lists on topics in early, elementary, and middle level education. She has authored a number of journal articles, book chapters, and conference papers on topics related to full-text information online, information technology, and early childhood education, and is the former editor of two nationally marketed newsletters. Rothenberg has been involved in online educational networking since the early 1980s.

Donald F. Rubovits has a B.A. from Carleton College, a B.S. from MIT, and an M.B.A. from the University of Chicago. He has held a variety of positions with AT & T, A. T. Kearney (management consultants), and Brunswick Corporation. For the past 13 years, he has managed WorkFlow Incorporated.

Karen Clark Salinas, M.S.W. in social work from the University of North Carolina, Chapel Hill, is senior research assistant at the Center on School, Family, and Community Partnerships and the Center for Research on the Education of Students Placed at Risk (CRESPAR) at Johns Hopkins University. She is co-author of the inventory "Starting Points" that helps schools identify their present practices of

partnerships; the Teachers Involve Parents in Schoolwork (TIPS) manuals and prototype interactive homework materials; surveys of teacher, parent, and student views on partnerships; and the book *Promising Practices in the Middle Grades.* Ms. Salinas is communications director of the National Network of Partnership Schools, edits the newsletter *Type 2,* and coordinates training workshops for members of the Network.

Mavis G. Sanders, Ph.D. in education from Stanford University, is associate research scientist at the Center for Research on the Education of Students Placed at Risk (CRESPAR), and assistant director of the Center on School, Family, and Community Partnerships and the National Network of Partnership Schools at Johns Hopkins University. She is the author of articles on the effects of school, family, and community support on African American adolescents' school success and case studies of schools in Baltimore that are working to develop their partnership programs. She also co-authored a review of international studies of school, family, and community connections and other publications on partnerships. She is interested in how schools involve families that are traditionally hard to reach, how Action Teams meet challenges for implementing excellent programs and practices, and how schools define "community" and develop meaningful school–family–community connections.

Beth S. Simon, M.A. in sociology from Johns Hopkins University, is a doctoral candidate in the Department of Sociology at Johns Hopkins University. She is dissemination director of the National Network of Partnership Schools, overseeing the distribution and collection of membership forms and data for the Network, and she is designer and manager of the Network's Web site. Ms. Simon is co-author of a report on the effects of interactive homework on student learning in the middle grades and is conducting research on patterns of participation of states, districts, and schools in the Center's National Network of Partnership Schools. Her other interests include school effects on family involvement and student success.

Mary Ellen Simon is editor/information specialist in the Urban Child Research Center of the Maxine Goodman Levin College of Urban Affairs at Cleveland State University (CSU) in Cleveland, Ohio. She received her M.Ed. in higher education at Cleveland State University (1986) and is a graduate student in the master's program for English at Cleveland State. After 8 years as assistant to the dean in the CSU College of Education, Ms. Simon joined the Urban Child Research Center where she is responsible for publishing the educational and social science research of the Center. In this capacity, she is involved not only in traditional publishing, but also in electronic publication and information retrieval from the Internet. For 4 years, she has been a member of NeighborhoodLink, a group of professionals working to provide inner-city neighborhoods with access to computers and computer education, and concerned about the quality and educational content of the Internet.

Stephanie Snow is a research assistant at the American Institutes for Research (AIR). Ms. Snow received her B.A. from Haverford College. Most of her work at AIR is with the Center for Effective Collaboration and Practice, which focuses on children and youth with emotional and behavioral problems. Ms. Snow provides research and analytical support on studies and evaluations by developing and maintaining its extensive World Wide Web site, collecting data, reviewing research reports, completing literature reviews and library searches, and communicating with members of the research community.

Scott W. Somerville has worked as a computer technical specialist and is currently a legal representative for 19 states for the Home School Legal Defense Association. A graduate of Harvard Law School and Dartmouth College, he provides legal counsel for members, intervenes through negotiation or litigation on behalf of members who are challenged by their local school district, and works with home school leaders on legislation for 22 states and U.S. Territories. Scott and his wife, Marcia, have six children and have home schooled since 1985.

Josephine A. Swanson is a state program leader for Cornell Cooperative Extension. She holds a Ph.D. in adult, extension, and continuing education from Cornell and has over 25 years of experience in designing, delivering, and evaluating Extension community education programs. She is author of curricula and other educational materials in consumer education and has provided leadership for the development of satellite conferences, use of computer applications in family and consumer science programs, and a number of statewide grant-funded Extension programs in human development and family economics areas.

Sandra Ubelacker is a professor of secondary education at the University of Alberta, Edmonton, Alberta T6G 2G5. She has been involved in teacher education and international education (Kenya). Her main research interest for the past 20 years has been in the area of computers, keyboarding, and word processing. She has written seven textbooks used by students from elementary school to adult education. In 1988, her research interest shifted to computers and young children when she developed a keyboarding program for the Apple Centre of Innovation in Malmo School (Edmonton, Alberta). In this classroom, students had a computer on their desks and integrated the computer in the writing process. Because the responsibility for teaching of keyboarding has shifted from the high school to the elementary school, parents and teachers need to insure that touch typing and workstation procedures are given utmost attention. Without good keyboarding techniques, students are primary candidates for repetitive strain injuries as they approach the workplace.

Judith O. Wagner is the associate director for dissemination, ERIC Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) at the Center on Education and Training for Employment at Ohio State University in Columbus, Ohio. After graduating from St. Mary's College, Notre Dame, Indiana, she taught high school English for one year before entering the School of Library Science at the University of Michigan where she received her master's degree in library science. She worked in public, special, and university libraries before coming to ERIC/ACVE in 1979. Since then, she has coordinated all user service activity and has conducted many ERIC workshops for professional librarians and other ERIC users. She has presented many sessions at professional conferences such as the American Vocational Association, the National Business Education Association, and the National Center for Family Literacy. Judy is the Webmaster for ERIC/ACVE and has written several ERIC Digests including one on the use of the Internet in vocational education. She also contributed to the 1996 Practitioner File on "Demystifying the Internet... and Untangling the Web."

Garry R. Walz received his B.S. (*cum laude*), M.A., and Ph.D. at the University of Minnesota in counseling psychology with minors in human resources development and educational psychology. Currently Dr. Walz is director of the ERIC Counseling and Student Services Clearinghouse (ERIC/CASS) and senior research scientist at the University of North Carolina at Greensboro. He also is professor emeritus of the University of Michigan. He has taught and conducted research and development programs at the University of Minnesota, North Dakota State University, and Illinois State University. Dr. Walz is a past president of the American Counseling Association, Association for Counselor Education and Supervision, and a former chair of North Central ACES. He has served as chair of the Counseling and Guidance Foundation (CGCF), ACA Media and Technology Committee, NCDA Research Awards Committee, and is a member of the ACA Strategic Planning Committee. His many honors include the award of the coveted Gilbert and Kathleen Wrenn Humanitarian Award, ACES Innovation in Counseling, ACES Leadership in Counselor Education, the Chi Sigma Iota Distinguished Scholar Award, and the AAC Exemplary Practices Award (1996). Dr. Walz has authored or co-authored over 50 major publications including hardcover texts, monographs, journal articles, and instructional modules. Dr. Walz's major interests/activities are broad, including futurism, career development, counseling education, counselor efficacy, dissemination and utilization of knowledge, and counselors and the information superhighway.

Anthony George Wilhelm is director of information technology research at the Tomás Rivera Policy Institute, an organization whose mission is to inform policy makers about issues of concern to the Hispanic community. He received his Ph.D. from the Claremont Graduate University's Center for Politics and Economics. His dissertation examined the role of emerging telecommunications technologies in empowering underserved communities in the United States. He received his B.A. and M.A. in government from the University of Virginia. His published works include *Explaining Access to Computer-mediated Political Life* (1997); *Out of Reach: Latinos, Education and Technology in California* (1997); and *Latinos and Information Technology*. His research interest focuses on the impact of emerging communications technologies on political, economic, social, and educational life in U.S. society. Two areas in which he has paid particular attention are: (1) questions around inequalities in access to advanced telecommunications technologies, particularly in minority and low-income communities; and (2) questions around how emerging technologies can facilitate full participation in society on the part of minority, low-income, and rural users, including spurring greater economic

development, social integration, enhanced educational opportunities, and political participation. Dr. Wilhelm has been keynote speaker, panel moderator, or participant at numerous conferences across the country related to technology and its role in society.

Nancy Willard is director of the newly established Center for Responsible Use of Information Technologies at the University of Oregon College of Education (http://ces.uoregon.edu/responsibleuse/default.html). The Center will engage in research and outreach services around issues of responsible use of information technologies. Ms. Willard has degrees in law and special education and has engaged in technology planning activities with school districts for over 7 years.

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The National Parent Information Network (NPIN)

The ERIC Clearinghouses on Elementary and Early Childhood Education (ERIC/EECE) and on Urban Education (ERIC/CUE) invite you to join them on the National Parent Information Network (NPIN), an Internet-based information network and service for parents, organizations, and individuals who support parents in raising and educating their children.

What Is NPIN?

The National Parent Information Network (NPIN) finds and shares high-quality materials related to parenting and parent involvement in education. The focus is on creating an attractive, widely available resource collection that incorporates graphics and other parent-friendly features of the Internet. NPIN:

- provides an attractive, single point of access on the World Wide Web to high-quality information on parenting and parent involvement in their children's education;
- continually adds new information to its already broad collection for parents and those who work with parents; and
- provides workshops for parents and parenting professionals in the skills needed to use NPIN and other World Wide Web resources.

For parents . . . NPIN offers easy access to high-quality information on raising healthy children and on becoming informed partners in their children's education.

For organizations . . . NPIN provides research-based information that can be incorporated with local resources on parenting and on how parents can be actively involved in their children's learning—at home, at school, and in their communities.

What Does NPIN Do?

Since 1993, NPIN has been developing one of the largest collections of high-quality, noncommercial information on the Internet on parenting, child development, and family life. The U.S. Department of Education, through the National Library of Education, supports the National Parent Information Network through the ERIC program.

NPIN provides the following services:

PARENT NEWS — An award-winning Internet source of news for parents on child rearing and education, *Parent News* is updated every 2 months and includes feature articles; listings and descriptions of parenting-related organizations, newsletters, books, and Internet sites; and community parent-support programming ideas.

PARENTS AskERIC — A question-and-answer service for parents and those who work with parents on issues related to child development, care, and education. Questions can be forwarded to NPIN through electronic mail and U.S. mail, or by calling our toll-free number.

PARENTING-L — An informal Internet discussion list for parents and parenting professionals that focuses on current parenting concerns.

RESOURCES FOR PARENTS AND PARENTING PROFESSIONALS — A large and growing collection of articles, essays, and other materials on family life, child development, and parenting from birth through early adolescence.

NPIN ILLINOIS — An information service and World Wide Web site that connects parents and families to services and resources around the state. Visit the information link for Illinois families at: http://npinil.crc.uiuc.edu

How Can You Participate?

- Visit NPIN's Web site at: http://npin.org
- Use PARENTS AskERIC by emailing parenting questions to askeric@askeric.org, mailing questions to the address given below, or by calling our toll-free number—800-583-4135.
- Work with NPIN to share your high-quality parenting materials. The list of organizations contributing information to NPIN continues to expand. It includes the Center on School, Family, and Community Partnerships; the National Association for the Education of Young Children; the National Urban League; National Fathers' Network; and many other organizations.
- Provide feedback, and suggest new materials to be acquired and topics or issues that you or the families you work with would like to see included on the National Parent Information Network.
- Contact NPIN to discuss a workshop for your local family center, library, Head Start program, school, or parenting organization.

For more information, contact:

National Parent Information Network
ERIC Clearinghouse on Elementary and Early Childhood Education
University of Illinois at Urbana-Champaign
Children's Research Center
51 Gerty Drive
Champaign, IL 61820-7469
phone: 217-333-1386

World Wide Web: http://npin.org

Electronic Mail: npin@uiuc.edu

Toll-Free Number: 800-583-4135

Families, Technology, & Education Initiative: http://npin.org/fte.html

ERIC ERIC Clearinghouse on Elementary and Early Childhood Education and the National Parent Information Network

The Educational Resources Information Center (ERIC) & ERIC Clearinghouse on Elementary and Early Childhood Education

The **Educational Resources Information Center (ERIC)** is a national information system designed to provide users with ready access to an extensive body of education-related literature. Established in 1966, ERIC is supported by the U.S. Department of Education, Office of Educational Research and Improvement, and is administered by the National Library of Education.

The ERIC database, the world's largest source of education information, contains nearly a million abstracts of documents and journal articles on education research and practice. You can access the ERIC database online via the Internet, on CD-ROM, or through the printed abstract journals *Resources in Education* and *Current Index to Journals in Education*. The database is updated monthly (quarterly on CD-ROM), ensuring that the information you receive is timely and accurate.

The ERIC system, through its 16 subject-specific clearinghouses, associated adjunct clearinghouses, and support components, provides a variety of services and products that can help you stay up to date on a broad range of education-related issues. Products include research summaries, bibliographies, reference and referral services, computer searches, and document reproduction.

The **ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE),** one of the 16 ERIC clearinghouses, specializes in the education, care, and parenting of children from birth through early adolescence, and operates the National Parent Information Network (NPIN). All the ERIC clearinghouses acquire significant literature within their particular scope; select the highest quality and most relevant materials; and catalog, index, and abstract them for input into the ERIC database. The clearinghouses also provide research summaries, bibliographies, information analysis papers, and many other products and services. Together, the clearinghouses present the most comprehensive mosaic of education information in the country.

For more information on the ERIC system and ERIC/EECE, please visit our World Wide Web site at http://ericeece.org or call us at 1-800-583-4135.